UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

In the Matter of:	Docket No. 72-22-ISFSI
PRIVATE FUEL STORAGE, LLC (Independent Spent Fuel Storage Installation)	ASLBP No. 97-732-02-ISFSI November 23, 1997

STATE OF UTAH'S CONTENTIONS ON THE CONSTRUCTION AND OPERATING LICENCE APPLICATION BY PRIVATE FUEL STORAGE, LLC FOR AN INDEPENDENT SPENT FUEL STORAGE FACILITY

Pursuant to 10 CFR § 2.714(b), the State of Utah hereby submits its contentions regarding the construction and operating license application by Private Fuel Storage, LLC's for an Independent Spent Fuel Storage Installation on the Skull Valley Band of Goshutes reservation, Utah. Contentions regarding general NEPA issues, the intermodal transfer site, quality assurance, financial assurance, emergency planning, geotechnical and seismic issues are supported by the Declaration of Lawrence White, PE, Executive Vice President and Senior Program Manager of Versar, Inc., attached hereto as Exhibit 1. Contentions regarding NRC dose limits, facilitation of decommissioning, thermal design, inspection and maintenance of safety components, quality assurance, helium in canisters, technical

qualifications, impacts of onsite storage and transportation of spent nuclear fuel, are supported by the Declaration of Dr. Marvin Resnikoff, Senior Associate of Radioactive Waste Management Associates, attached hereto as Exhibit 2. Other contentions are supported by Affidavits as specified in the particular contention. As documented below, the Applicant, Private Fuel Storage, LLC, does not comply with 10 CFR Part 72 and regulatory guidance. In fact, the license application is substantially incomplete. The State of Utah therefore respectfully submits that this license should be denied.

A. Statutory Authority

CONTENTION: Congress has not authorized NRC to issue a license to a private entity for a 4,000 cask, away-from reactor, centralized, spent nuclear fuel storage facility.

BASIS: The NRC may only license the storage of spent fuel at facilities which are authorized by statute. Bowen v. Georgetown Univ. Hosp., 488 U.S. 204, 208 (1988) ("It is axiomatic that an administrative agency's power to promulgate legislative regulations is limited to the authority delegated by Congress."). The Nuclear Waste Policy Act (NWPA), Part B, Interim Storage Program, 42 USC §§ 10151 - 10157, defines the scope of facilities authorized for interim storage of spent nuclear fuel. In light of the NWPA, NRC cannot rely on its general statutory authority or authority to license spent nuclear fuel as the source of its authority to license a centralized 4,000 cask away-from-reactor facility operated by a limited liability corporation. American Petroleum Institute v. EPA, 52 F.3d 1113, 1119 (D.C. Cir. 1995) ("EPA cannot rely on its general authority to make rules necessary to carry out its functions when a specific statutory directive defines the relevant functions of EPA in a particular area."); Sierra Club v. EPA, 719 F.2d 436, 455 (D.C. Cir 1983), *cert. denied*, 468 U.S. 1204 (1984). NRC's general licensing authority does not give NRC carte blanche authority to make any rules it wishes regarding away-from-reactor storage of spent nuclear fuel.

Initially, NRC licensed ISFSIs under its general regulation for the Domestic

Licensing of Special Nuclear Material, 10 CFR Part 70. *See* 45 Fed. Reg. 74,693 (Nov. 12, 1980). Chapter 6 of the Atomic Energy Act deals specifically with special nuclear material in terms of the acquisition and domestic and foreign distribution of special nuclear material. 42 USC §§ 2071, 2073 to 2077. Under the Atomic Energy Act congressional authorization extended to NRC's authority to license civilian ownership and possession of special nuclear material. 42 USC § 2073. However, it was not until the NWPA that Congress specifically addressed storage of spent nuclear fuel.

In the NWPA of 1982 Congress specifically authorized private storage of spent nuclear fuel at reactor sites. Congress authorized storage of spent nuclear fuel away from reactors only at federally owned facilities. 42 USC § 10,155(h). Neither the NWPA, nor the statutory basis in 1980 for NRC to promulgate Part 72, can be construed as authorizing NRC to issue a license for a 4,000 cask, centralized, privately owned, away-from-reactor, nuclear waste storage facility that is being sought by this Applicant.

The NWPA expresses Congress's purpose and intent in dealing with spent nuclear fuel storage.[1] 42 USC § 10,151. Congress directed the NRC and other authorized federal officials to encourage and expedite the storage of spent nuclear fuel at the site of each civilian nuclear power reactor. 42 USC §§10,151 and 10152. Congress granted the NRC

[1] As stated in the legislative history of the Nuclear Waste Policy Act of 1982, PL 97-425, House Report No. 97-491, Pt. 1, p.26 "Background," U.S. Code Cong. & Admin. News 1982, at 3,792: "The need for legislation to address problems besetting nuclear waste management, and **Congressional efforts to address these problems**, has increased and become urgent since the early 1970's. Prior to this time, the inventory of wastes from nuclear activities grew with little public notice and **minor Congressional concern**. (*emphasis added*).

rulemaking authority for licensing technologies for the storage of civilian spent nuclear fuel at the site of any civilian nuclear power reactor. Id. § 10,153. Finally, the NWPA authorized the "establishment of a federally owned and operated system for the interim storage of spent nuclear fuel at one or more facilities owned by the Federal Government with not more than 1,900 metric tons of capacity...." Id. § 10,151(b)(2).

Congress imposed limits on centralized storage of spent nuclear fuel. First, the facility is to be federally owned and operated. 42 USC § 10,155(a). Second, maximum storage capacity is no more than 1,900 metric tons. Id. Third, when providing storage capacity, Congress directed the Department of Energy (DOE) to seek to minimize the transportation of spent nuclear fuel. Id. at § 10155(a)(3). Fourth, storage of spent fuel must be removed from the site not later than 3 years following the date on which a repository or monitored retrievable storage (MRS) facility is available. Id. § 10,155(e). Finally, Congress imposed annual reporting requirements on DOE. Id. § 10155(f).

The stark contrast between what the Applicant is requesting NRC to authorize under Part 72 and the directives Congress imposed on the federal ownership and operation of centralized interim away-from-reactor storage under the NWPA bespeaks the lack of statutory authority for NRC to license the proposed PFS facility. First, the Applicant's facility would not have the backing of the federal government but would be owned and operated by a limited liability company with no independent assets. Second, instead of a maximum limit of 1,900 metric tons the Applicant requests a maximum limit of 40,000 metric tons. Third, spent nuclear fuel would be transported from all over the United States,

primarily from the eastern states, thousands of miles to the Utah facility. Fourth, the Applicant's facility is de-linked from completion of Yucca Mountain or an MRS. There is no assurance that the stored fuel in Utah will ever be moved. Finally, as the licensing of an off-site ISFSI is totally an NRC regulatory creation, there are no Congressional reporting requirements.

Another glaring aberration between this Applicant's proposal under Part 72 and the centralized away-from-reactor storage under NWPA is to contrast the involvement of States. *See* 42 USC § 10,155(d). First, under NWPA, the Secretary of Energy must appraise the State Governor and its legislature of potentially acceptable interim storage sites and the Secretary's intention to investigate those sites. 42 USC § 10,155(d)(1). Second, the Secretary is required to give timely updates and results of investigations to the Governor and State legislator and enter into negotiations to establish a cooperative agreement between the Secretary and the State. Under such an agreement the State "shall have the right to participate in a process of consultation and cooperation ... in all stages of the planning, development, modification, expansion, operation and closures of storage capacity at a site or facility within such State for the interim storage of spent fuel from civilian nuclear power reactors." Id. § 10,155(d)(2). Third, the cooperative agreement must include sharing of all technical and licensing information; use of available expertise; joint project review, surveillance and monitoring arrangements; and schedule of milestones and decisions points and opportunities for State review and objection. Id. § 10,155(d)(3). Fourth, the Secretary must periodically report to Congress. Id. § 10,155(f). Finally, a State may voice its

disapproval to Congress of a proposal to construct storage capacity of 300 metric ton or larger at any one site. Id. § 10,155(d)(6).

In contrast to a cooperative agreement and meaningful role ascribed to the State under the NWPA, Part 72 requires no cooperation or involvement with the State. What has occurred to date is indicative of the pitiful role assigned to the State under Part 72. First, the Applicant made no effort to apprize the State of its proposed facility. The State first learned about the facility through press releases and by sending State officials to Washington, D.C. to attend meetings between the Applicant and the NRC that were open to the public. Second, there has been no cooperation or consultation between the Applicant and the State. Failure to even allow the State to review and comment on the Emergency Plan, as required by 10 CFR § 72.32(a)(14), is just one conspicuous example of the Applicant's refusal to deal up-front with the State. Finally, there is no opportunity for State review or oversight of the project, except through litigation. The State endeavored to place some its concerns before the NRC, prior to NRC's acceptance of the application, through 2.206 petitions but the NRC ignored those efforts. Instead, the State has to expend thousands of dollars to participate through intervention in the NRC formal license adjudication if it wants to have any voice in the siting and licensing of this facility. This is a far cry from the role Congress assigned to the State under § 10,155(d).

Another salient factor in the analysis of whether NRC has statutory authority to license the PFS facility is the way in which the Applicant will use public services without any compensation to government coffers. Congress recognized that there would be social and

economic impacts associated with a large centralized storage facility. 42 USC § 10,156(e). Accordingly, Congress authorized payment of up to $15 per kilogram of spent fuel or ten percent of costs associated with planning, public services and other social and economic impact costs. Part 72 imposes no requirements on the Applicant to give financial assistance to governmental entities. For example, if NRC licenses the PFS facility, annual shipments of up to 200 casks of nuclear waste may travel through the rail congested and populated Wasatch front area, including downtown Salt Lake City. The State at least receives training and financial assistance from the federal government for the military nuclear waste shipments (such as WIPP wastes) passing through the State as it would if this facility were authorized by the NWPA. But no such assistance will be forthcoming from this Applicant. In fact, the State is unaware of what arrangements the Applicant intends to use to safeguard shipments and respond to emergencies en route, at Rowley Junction, or along Skull Valley Road. Rather than receiving financial assistance, the State of Utah will be forced to expend funds to ensure that its citizens will not be harmed.

After comparing what this Applicant is requesting and what Congress requires under the NWPA, it should be obvious that NRC by regulation is thwarting the national policy and directives Congress set in the NWPA. NRC is without statutory authority to license the proposed PFS facility.

B. License Needed for Intermodal Transfer Facility

CONTENTION: PFS's application should be rejected because it does not seek approval for receipt, transfer, and possession of spent nuclear fuel at the Rowley Junction Intermodal Transfer Point ("ITP"), in violation of 10 CFR § 72.6(c)(1).

BASIS: PFS has applied to NRC for a materials license to possess spent nuclear[2] fuel rods for storage at the proposed ISFSI site on the Skull Valley Indian Reservation. *See* Notice of Hearing, 62 Fed Reg. 41,099 (July 31, 1997). PFS in its license application states: "Transportation of spent fuel shipping casks from the originating reactor to the [Private Fuel Storage Facility] will occur in accordance with 10 CFR 71 and the originating reactor's license, and is not a part of this License Application." LA at 1-3. PFS identifies two alternatives of shipping spent fuel to the ISFSI. The first alternative is to ship spent fuel by rail to an "Intermodal Transfer Point" at Timpie, also known as Rowley Junction, which lies about 24 miles north of the proposed ISFSI. SAR, Section 4.5.4. The ITS consists of a "rail siding off the Union Pacific Railroad mainline, a 150 ton gantry crane, and a tractor/trailer yard area." Id. The crane is single-failure proof, and housed in a weather enclosure. Id. At the ITS spent fuel casks will be transferred from railroad cars to heavy-haul tractor/trailer trucks for transport to the ISFSI. Id.

The other alternative identified PFS is to build a railroad spur from Rowley Junction directly to the ISFSI. SAR, Section 4.5.5.1. However, PFS has not shown that

[2] This contention is supported by the Declaration of Lawrence A. White, attached hereto as Exhibit 1.

it will be feasible to construct a rail spur from the Union Pacific mainline to the proposed ISFSI. *See* Contention T (Inadequate Assessment of Required Permits and Other Entitlements), whose basis 1(c) is incorporated herewith. Until such time as PFS can prove by documentary evidence that it will have the technical, legal and financial capability to construct a rail spur, the assumption should be made that shipments will be offloaded at Rowley Junction and transferred from rail to truck by PFS at the ITP at an intermodal building constructed at Rowley Junction. *See* SAR Fig. 4.5-1.

Contrary to PFS's assertions, the Rowley Junction operation is not merely a part of the transportation operation. Rather, PFS will be receiving and handling thousands of tons of spent nuclear fuel at a fixed location, using fixed equipment that is owned and operated by PFS for the purpose of facilitating the onsite storage of the spent fuel at the ISFSI. Moreover, given the enormous volume of spent fuel that must pass through the ITS, the laborious operation that is required to transfer the extremely heavy casks from railroad cars to heavy haul trucks, it is more than likely that casks shipped to the ITS will become bottlenecked there.[3]

The sheer volume of rail traffic carrying spent fuel casks coming into Rowley Junction will be substantial. The Applicant expects to receive shipments of up to 200

[3] Even in the unlikely event that PFS finds a way to build a rail spur from the Union Pacific mainline located to the north of Interstate 80 at Rowley Junction, by bringing the rail spur over or under Interstate 80, and acquiring the appropriate rights-of-way and other necessary approvals for a 24 mile long rail track to the Skull Valley reservation, the volume of rail traffic will likely result in some storage at Rowley Junction.

casks per year, all of which will come through Rowley Junction. SARat 1.4-2. Each cask will contain approximately 10 MTU (metric tons of uranium) of spent fuel.[4] Contrasting the anticipated volume and quantity of fuel shipments that will pass through Rowley Junction with similar shipments that occurred during 1979 to 1996, illustrates the magnitude of the shipping regime required under this license application. NRC's complication of total spent nuclear fuel shipments from nuclear utilities and research facilities during the period 1979 to 1996 shows there were 1,319 total shipments or 77 shipments per year. The total amount of fuel shipped was 1,413 MTU or 83 MTU per year, of which 75% was shipped by rail. U.S. NRC, Public Information Circular for Shipments of Irradiated Reactor Fuel, NUREG-0725, Rev. 12, Washington, DC: October 1997,at 4. The foregoing also illustrates that the volume of fuel to be handled at the Applicant's intermodal transfer facility will be unlike the intermodal transfer operations that have actually occurred at commercial nuclear power plant sites, such as heavy haul truck to onsite rail, when the power plant's on-site fuel handling building did not have a rail spur.

The volume of fuel shipments will not be capable of passing directly through Rowley Junction, especially given the recent and ongoing operational and safety concerns Union Pacific is experiencing with its railroad system, without undergoing storage. *See* State of Utah's Request for Hearing and Petition for Leave to Intervene**,**

[4] The Applicant is requesting a license for 40,000 MTU of spent fuel which will require approximately 4,000 casks. LA at 3-1.

Docket No. 72-22, Exh. 3. (filed Sept. 11, 1997). It is reasonable to assume that a number of casks will arrive via rail contemporaneously, necessitating some type of temporary storage at the site of the ITP. The operational constraints on the ITP associated with the anticipated slow speeds and long travel distances (24 miles one-way) required for heavy haul transport from the transfer point to the proposed ISFSI, the anticipated volume of shipments (100 to 200 casks annually, requiring 200 to 400 one-way heavy haul trips), and the anticipated use of a public highway (with no available heavy haul routing alternatives), a queuing of casks at the intermodal transfer point awaiting heavy haul transport is apparent. During the projected lifetime of the facility a large number of casks will be transported though the Rowley Junction, and at least part of the time, a cask or casks will be present at Rowley Junction, thus, making Rowley Junction a storage facility for nuclear materials.

The application fails to discuss the number of heavy haul trucks (referred to in the SAR as "heavy haul transport tractor/trailers") that will be available to transport the casks, the mechanical reliability of these units, and their performance under all weather conditions. Such a explanation is necessary to analyze the amount of queuing and storage that will occur at Rowley Junction. SAR 4.45.4.2 states that the maximum weight of the loaded shipping cask will be 142 tons and require the use of overweight trailers. The tractor/trailer are 12 feet wide and travels at "low speeds." Given the special design features, size and probably costs of these units (*see* Fig. 4.5-4), it is important to ascertain whether the Applicant anticipates acquiring more than only a few of these

units.

Another factor that may significantly contribute to the queuing of casks at Rowley Junction is the fact that PFS intends to return defective or contaminated casks to the originating utility. Thus, there are likely to be heavy haul trucks and railroad shipments going in both directions, necessitating greater use of cranes and more coordination of transfer operations.

As a result, the ITP will constitute a de facto interim spent fuel storage facility, as defined in 10 CFR § 72.3, at which PFS will receive, handle, and possess spent nuclear fuel for extended periods of time. Accordingly, PFS should not be granted a license unless it includes possession of spent nuclear fuel at the ITP.

Moreover, Part 72 licensing is necessary in order to protect the public health and safety. The ITP is stationary in nature, including the construction and installation of a facility and heavy equipment, the continuous presence of spent fuel arriving at or departing from the ITP, and the potential long-term storage of some of the fuel. Because of the stationary nature of the ITP, it is important to provide the public with the regulatory protections that are afforded by compliance with 10 CFR Part 72. For instance, PFS should have a security plan that protects the site from intruders according to NRC standards. There should also be an emergency plan to protect workers and the public in the event of an accident at the ITP. In addition, the boundaries of the ITP site should be identified, and dose analyses performed to ensure that nearby members of the public are not exposed to unacceptable doses from spent fuel that is sitting on the site.

PFS should also provide assurance that the ITP is designed in a way that protects public health and safety, using appropriate structures, equipment, and protective measures. None of this information is currently provided in the SAR. In the absence of such measures, the ITP poses an unacceptable safety and health risk to workers and the public.

C. Failure to Demonstrate Compliance With NRC Dose Limits.

CONTENTION: The Applicant has failed to demonstrate a reasonable assurance that the dose limits specified in 10 CFR § 72.106(b) can and will be complied with.[5]

BASIS: Pursuant to 10 CFR § 72.106, any individual located on or beyond the nearest boundary of the controlled area of an ISFSI may not receive a dose greater than 5 rem to the whole body or any organ from any design basis accident. NRC regulations at 10 CFR § 72.126(d) require the submission of analyses that demonstrate compliance with this requirement. In addition, 10 CFR § 72.24(m) requires that an application for an ISFSI or MRS license must contain an "analysis of the potential dose equivalent or committed dose equivalent to an individual outside the controlled area from accidents or natural phenomena events that result in the release of radioactive material to the environment or direct radiation from the ISFSI or MRS." The dose calculations "must be performed for direct exposure, inhalation, and ingestion occurring as a result of the postulated design basis event." *See also* NUREG-1567, Standard Review Plan for Spent Fuel Dry Storage (Draft) at 12-3 (October 1996), which defines a design-basis accident as "the subset of all credible accidents that bound the entire spectrum of accidents that could occur in terms of the nature and consequences of accidents."

The Applicant does not meet the requirements of 10 CFR §§ 72.106(b),

[5] This contention is supported by the Declaration of Marvin Resnikoff, attached hereto as Exhibit 2.

71.126(d), or 72.24(m) in two respects. First, the Applicant makes assumptions about the HI-STORM and TranStor casks that have not been reviewed or approved in a proceeding for approval of those casks. Second, the Applicant fails to provide an adequate evaluation of the dose consequences of a design basis accident involving loss of containment barrier. The analysis performed by the Applicant is internally inconsistent, and fails to take into account significant factors affecting the dose consequences of a design basis accident involving loss of confinement barrier.

The Applicant's failure to demonstrate that offsite doses can be contained within acceptable limits not only violates 10 CFR §§ 72. 106(b), 71.126(d), and 72.24(m), but undermines the Applicant's basis for failing to require offsite emergency planning measures in the event of an accident. As discussed in the preamble to the Commission's 1986 proposed amendments to the Part 72 standards, the determination that "special offsite emergency preparedness" is not necessary for spent fuel storage is based on the assumption that doses calculated to result from potential accidents are "far below" EPA protective action guides. 51 Fed. Reg. 19,106, 19,109 (May 27, 1986). Because this assumption appears to be valid in the case of the proposed ISFSI, the need for offsite emergency planning must be considered.

1. Use of unreviewed data about HI-STORM and TranStor casks. According to the Applicant, the design basis accident is based in part on the design of the Holtec-HI-STORM and SNC TranStor casks. *See, e.g.,* SAR at 8.2-2 - 8.2-10, 8.2-16 - 8.2-17, 8.2-22, 8.2-25 - 8.2-26, 8.2-31 - 8.2-34, 8.2-38. The design for these casks has yet to be fully

reviewed or approved by the NRC; thus, they provide an inadequate basis for the SAR.

2. Selective and inappropriate use of data sources, failure to consider significant dose contributors, and use of outdated model. In Section 8.2.7, the Applicant evaluates a hypothetical loss of confinement barrier, which is defined in the applicable industry guidance (ANSI/ANS 57.9) as a Design Event IV. Although the Applicant does not deem this accident to be credible, it nevertheless proceeds to evaluate the dose consequences of the accident, and concludes that they are below the dose limits specified in 10 CFR § 72.106(b). The Applicant's assertion that a loss of confinement accident is not credible is contradicted by studies showing the credibility of sabotage-induced accidents which lead to loss of confinement barrier. *See, e.g.*, Halstead and Ballard, Nuclear Waste Transportation Security and Safety Issues; The Risk of Terrorism and Sabotage Against Repository Shipments, for the Nevada Agency for Nuclear Projects at 25 (October 1997), Exhibit 3. Moreover, the Applicant's analysis of the dose consequences of loss of containment barriers is inadequate, because it makes selective and inappropriate use of data sources regarding doses, and fails to take important dose contributors into account.

a. Selective and inappropriate use of data sources. First, the Applicant's accident analysis, presented in Section 8.2.7.2 of the SAR, makes inconsistent use of regulatory guidance and studies to support its conclusion that doses from the postulated accident scenario will be below regulatory limits. As presented in the table on page 8.2-37, the Applicant assumes that the fraction of Cs-134, Cs-137, and Sr-90 that

will be released into the canister is 2.3 E-5 for each constituent. This fraction comes from NUREG-1536, Standard Review Plan for Dry Cask Storage Systems. Then, PFS uses figures from a report by Sandia National Laboratories on impacts of transportation accidents, to argue that of the fraction released from the spent fuel to the canister, 90% of the volatiles (Co-60, Sr-90, I-129, Ru-106, Cs-134 and Cs-137) will not escape the canister. SAR at 8.2-38, *citing* Table XIX of SAND80-2124, Transportation Accident Scenarios for Commercial Spent Fuel, Sandia National Laboratories (1981) (hereinafter "Sandia report"). The use of the 90% figure is suspect in two respects. First, PFS's use of the Sandia Report is selective. The Sandia Report also provides an estimate of the initial release fraction into the canister, of 4E-3. Id. at 8.2-39. This is almost 200 times greater than the initial release fraction estimated in NUREG-1536, and used by PFS. PFS appears to have selectively chosen data that would support a lower dose calculation. As a result, PFS estimates a release from the canister of 1.15 E-7, which is a factor of almost 3,000 smaller than the release of 3 E-4 estimated by Sandia. SAND-2124 at 42, Scenario 4. Moreover, the assumption that 90% of the inventory will not be released is based on a transportation accident scenario, in which the cask is breached through a high-velocity impact. *See* SAND-2124 at 25-30, Accident Scenarios. In contrast, the scenario evaluated in the SAR involves an accident during onsite storage. PFS does not appear to have evaluated the differences in the characteristics of high-velocity transportation accidents and accidents involving static storage of dry casks, and thus does not provide a basis for the use of the Sandia figure.

The Applicant also relies on the Sandia report for its assumption that only 5% of the release fraction of Co-60 and Sr-90 will be respirable.[6] SAR at 8.2-39. Based on this assumption, the Applicant calculates a committed effective dose equivalent (CEDE) to an adult at 500 meters from the HI-STORM cask to be 547 mrem, that is, less than the regulatory limit of 5 rems. Again, PFS does not explain why it was appropriate to use this particular assumption from the Sandia Report, but not the assumption regarding the initial release to the plenum, which would have yielded a higher dose than calculated by PFS. Moreover, Sandia's assumption of a 5% respirable release fraction is based on a transportation accident involving impact and fire, in which some irradiated fuel will flake off in large pieces and not be respirable. SAND-2124 at 38. While this may be an appropriate assumption for a transportation accident, PFS provides no evidence that it is an appropriate assumption for the fuel failure accident evaluated in the SAR. In fact, it is reasonable to anticipate that in an onsite accident not involving a high-velocity impact that breaks fuel into large chunks, particulates in the gap between the canister and the cask will be of a smaller size. Therefore a greater percentage will be respirable.

b. Failure to take dose contributors and relevant guidance into account. PFS calculates the dose to an adult 500 m from the accident, due solely to inhalation of the passing cloud. SAR at 8.2-39. Other relevant pathways, such as direct radiation from cesium deposited on the ground, and ingestion of food and water or incidental soil ingestion, are not considered, in violation of 10 CFR § 72.24(m). PFS also

[6] Respirable particles have a diameter of less than 10 μm.

appears to assume that local residents will be evacuated until contamination is removed, although this is not expressly discussed. This is an unreasonable assumption because PFS's emergency plan does not assume residents are evacuated. In addition, PFS fails to calculate doses to children, which are higher because a child's ratio of surface area to volume of organs is higher. Finally, PFS uses the ICRP-30 dose model, which is an outdated dose model that is inadequate to calculate radiation doses to humans, especially inhalation doses. PFS should be required to use the ICRP-60 dose model which is more accurate for human radiation doses, and also correctly calculates the dose to children.

D. Facilitation of Decommissioning

CONTENTION: The proposed ISFSI is not adequately designed to facilitate decommissioning, because PFS has not provided sufficient information about the design of its storage casks to assure compatibility with DOE repository specifications. Moreover, in the reasonably likely event that PFS's casks do not conform to DOE specification, PFS fails to provide any measures for the repackaging of spent fuel for ultimate disposal in a high level radioactive waste repository. Moreover, PFS provides no measures for verification of whether the condition of spent fuel meets disposal criteria that DOE may impose.[7]

BASIS: Pursuant to 10 CFR § 72.130, an ISFSI or MRS:

> must be designed for decommissioning. Provisions must be made to facilitate decontamination of structures and equipment, minimize the quantity of radioactive wastes and contamination of structures and contaminated equipment, and facilitate the removal of radioactive wastes and contaminated materials at the time the ISFSI or MRS is permanently decommissioned.

Reg. Guide 3.48 also states that "the applicant should discuss the considerations given in the design of the facility and its auxiliary systems, including the storage structures, to facilitate eventual decommissioning." Id. at 3-8.

Proposed measures to facilitate the decommissioning of the proposed PFS facility are discussed in Appendix B of the License Application, and in Section 3.5 of the SAR. Neither of these discussions proposes any measures for addressing the significant

[7] This contention is supported by the Declaration of Marvin Resnikoff, attached hereto as Exhibit 2.

impediment to safe, timely, and efficient decommissioning of the proposed ISFSI, posed by the potential incompatibility between the design of PFS storage canisters and the DOE's acceptance criteria for the packaging of spent fuel in a high level nuclear waste repository. These criteria are currently under development.

The SAR states that, "When the storage period for any particular canister of spent fuel is completed, the canister shall be transferred into a shipping cask and shipped offsite." Id. at 3.5-2. No further details are provided, except a reference to Section 2.4 of the HI-STORM and TranStor applications**,** and Appendix B of the License Application mentioned above. Section 2.4 of the TranStor application does not address the issue of compatibility with DOE requirements at all. Section 2.4 of the HI-STORM application states that the HI-STORM canister is "[d]esigned to be completely congruent with the MPC concept, as articulated by the U.S. Department of Energy." However, the HI-STORM application provides no information regarding the nature of the "MPC concept", how it relates to DOE waste acceptance criteria, or how exactly the HI-STORM system is "congruent" with the concept. In the absence of any such information, there is no basis for concluding that PFS has taken any measures to facilitate the decommissioning of the ISFSI by ensuring compatibility of its storage casks with DOE acceptance criteria.

Moreover, although DOE has not yet issued its design criteria, currently available information shows a significant potential for disparities between the waste acceptance

criteria and the specifications for PFS's storage canisters. For instance, DOE will have requirements on thermal limits per unit area. DOE will have limits on the size and weight of shipping containers. Sierra Nuclear and Holtec storage casks may be incompatible with these acceptance criteria. DOE's MPC cask is designed to hold 21 PWR fuel assemblies, i.e., less fuel assemblies than the Holtec (24 or 32 PWR assemblies) and the Sierra Nuclear canister. DOE, Office of Civilian Radioactive Waste Management, Multi-Purpose Canister (MPC) Implementation Program, Conceptual Design Phase Report, Volume I -- MPC Conceptual Design Summary Report (Final Draft: September 30, 1993) attached as Exhibit 4. DOE may also require that irradiated fuel be transferred to the proposed Yucca Mountain repository in DOE casks, which may not be compatible with the Holtec or TranStor canister.

DOE may also place limits on the acceptable physical state of irradiated fuel, *i.e*, by requiring a demonstration that there are no gross cladding defects. It is reasonable to anticipate that in connection with such a requirement, DOE will require that a representative canister of irradiated fuel be opened to demonstrate that irradiated fuel is acceptable. Although 10 CFR § 72.122(h) requires PFS to confine spent fuel in a way that degradation of fuel during storage will not pose operational safety problems with respect to its removal from storage, PFS has no means of inspecting the interior of spent fuel canisters in order to determine the condition of the fuel for purposes of complying with this requirement.

In order for PFS to transfer fuel to casks that are compatible with DOE

requirements, or to inspect the fuel for degradation of cladding, a hot cell is needed. In the hot cell, fuel cylinders with degraded cladding would be removed from the canister, repackaged, and replaced in the canister. However, PFS's design makes no provision for a hot cell. Instead, PFS apparently expects that these operations will take place at the originating reactor or at the Yucca Mountain repository.

Neither of these expectations is realistic. Few, if any of the originating reactors will be available to handle irradiated fuel by the time Yucca Mountain is ready to receive spent fuel, which may be as late as 2063, or even later. The proposed repository is not expected to operate until the year 2015, according to the NRC, or as late as the year 2023, according to the GAO. GAO/T-RCED-93-58, Yucca Mountain Project Management and Funding Issues, statement of Jim Wells (1993). A queue has been established for the first ten years of repository operation. DOE/RW-0457, Department of Energy Annual Capacity Report (OCRWM: March 1995), attached hereto as Exhibit 5. On average, power plants will be able to unload approximately ¼ of their irradiated fuel inventory the first ten years. It may require an additional 30 years to dispose of the remainder. That is, it is entirely possible that all irradiated fuel may not leave the PFS site until the year 2063, if the Yucca Mountain repository is indeed licensed in the year 2023. At such a late date, it is unlikely that irradiated fuel pools will be available to transfer fuel from one canister to another.

It is also unreasonable to rely on a facility to transfer individual fuel assemblies at Yucca Mountain. First, if fuel is degraded, it should not be shipped from the ISFSI.

Degradation of cladding increases the risk of accidents during transportation, because it diminishes or removes one of the key barriers to environmental release of radiation. Instead, the problem should be addressed at the ISFSI. Moreover, there is no reason to believe that the Yucca Mountain facility will be equipped with the necessary equipment to handle inspections and inter-cask transfers for the many cask designs that are now and will be in use when it is opened. It is far more reasonable for the DOE to require all potential users of the repository to properly package their waste before shipping it to the facility.

Thus, contrary to the requirements of 10 CFR § 72.130 and Reg. Guide 3.48, the PFS facility is not designed to facilitate decommissioning, because the facility does not have the capability to repackage canisters by transferring individual fuel assemblies.

E. Financial Assurance.

CONTENTION: Contrary to the requirements of 10 CFR §§ 72.22(e) and 72.40(a)(6), the Applicant has failed to demonstrate that it is financially qualified to engage in the Part 72 activities for which it seeks a license.[8]

BASIS: A Part 72 application must state "information sufficient to demonstrate to the Commission the financial qualifications of the Applicant to carry out, in accordance with the regulations in this chapter, the activities for which the license is sought." 10 CFR §72.22(e).

The Commission will issue a license upon a finding that "the applicant for an ISFSI or MRS is financially qualified to engage in the proposed activities in accordance with the regulations of this part." 10 CFR § 72.40(a)(6).

The Part 72 standard, which is very general, may be interpreted by reference to the standards for financial qualifications set forth in 10 CFR Part 50 and Appendix C. A recent decision by the Licensing Board, interpreting the financial requirements in 10 CFR Part 70, illustrates the reasons why it is appropriate to apply the Part 50 standards to PFS. *See* Louisiana Energy Services, L.P. (Claiborne Enrichment Center), 44 NRC 333 (1996) (appeal pending) (hereafter "Claiborne"). In that case, the Licensing Board relied on the Part 50 regulations to review the financial qualifications of a newly formed special purpose entity without an operating record in a Part 70 licensing action. Under

[8] This contention is supported by the Declaration of Lawrence A. White, attached hereto as Exhibit 1.

Part 70, the Commission will approve a license if it determines that "the Applicant appears to be financially qualified to engage in the proposed activities in accordance with the regulations of this part." 10 CFR §72.23(a)(5). The Part 50 standard contains very similar language, requiring the Commission to consider whether "[t]he applicant is technically and financially qualified to engage in the proposed activities in accordance with the regulations in the chapter." 10 CFR § 50.40(b). In Claiborne, the Board turned to the rule of statutory construction that provisions that relate to the same subject matter should be construed *in pari materia*. Id. at 384, *citing* 2B Sutherland Stat. Const. §§ 51.05, 51.05 (5th ed. 1992). Moreover, the Board found the Part 50 and Part 70 regulations "essentially began as twins." Id. At 391. As the Board observed:

> Although the paths of the regulations have diverged somewhat since 1967, the essence of the Part 70 and Part 50 regulations with respect to construction financing and the standard the Commission must apply in granting a license under these Parts has not significantly changed since the initial issuance of the regulations. At that time, because the critical language of the provisions was nearly identical, the provisions had the same basic meaning. Indeed, as the Director of Regulation's response to a congressional inquiry indicated, the Commission's financial qualifications reviews of Part 70 and Part 50 license applicants applied the same principles under both regulations at that time.

44 NRC at 391. Thus, the Board concluded that the regulations began with "the same basic meaning" that "has not significantly changed since the issuance of the regulations." Id. Finally, the Board found that Part 50 was applicable because the "fundamental purpose" of the Appendix C requirements, to protect public health and safety is "equally involved" in the licensing of a nuclear plant and "the first privately owned enrichment facility in the United States." Id. at 392.

The same analysis is applicable under Part 72. First, the language of the Part 50 and Part 72 standards is identical, requiring the license applicant to demonstrate that it "is financially qualified." Moreover, the congruent history of the Part 50 and 70 standards, which the Board describes in detail at 42 NRC 384-391, is equally applicable to the development of the Part 72 standard. Until 1980, ISFSIs were regulated under Part 70. The "Information Handbook on Independent Spent Fuel Storage Installations," NUREG 1571 at 1-1, 2, gives a brief history of the development of Part 72 regulations:

> ISFSI regulation was originally governed by 10 CFR Part 70, "Domestic Licensing of Special Nuclear Material." In 1974, the Atomic Energy Commission (predecessor of the NRC) issued a regulatory guide on storage of spent fuel in ISFSIs, Regulatory Guide 3.24, "Guidance on the License Application, Siting, Design, and Plant Protection for an Independent Spent Fuel Storage Installation," which then supported 10 CFR Part 70.... In November 1980, the staff issued 10 CFR 72, "Licensing Requirements for the Storage of Spent Fuel in an Independent Spent Fuel Storage Installation," superseding 10 CFR Part 70 and Regulatory Guide 3.24 with respect to the regulation of spent fuel storage in ISFSIs.

Moreover, the "fundamental purpose" of the Part 50 standard is "equally involved" in this case, where a newly formed entity seeks permission to construct and operate a first-of-its kind, major nuclear facility for the long-term storage of thousands of tons of spent nuclear reactor fuel. Thus, Part 50 provides relevant guidance to review whether this Applicant has demonstrated adequate financial assurance under Part 72.

The Applicant, Private Fuel Storage, LLC (PFS), is a Delaware limited liability company. LA at 1-4. The company was formed to construct and operate a privately

owned ISFSI for the purpose of providing private centralized spent nuclear fuel storage to the nuclear utility industry. ER at 1.2-2. The Applicant is a newly formed special purpose entity without an operating record. Thus, the regulatory standards in Part 50 for financial qualifications of newly formed entities must be applied to PFS's license application.

Under Part 50.33(f) "[e]ach application for a construction permit or an operating license submitted by a newly-formed entity organized for the primary purpose of construction or operating a facility must also include information showing:

> (i) The legal and financial relationships it has or proposes to have with its stockholders or owners;
> (ii) Its financial ability to meet any contractual obligation to the entity which they (sic) have incurred or proposed to incur; and
> (iii) Any other information considered necessary by the Commission to enable it to determine the applicant's financial qualifications.

Additional guidance, provided in Part 50, Appendix C, describes the general kinds of financial data and other related information that will demonstrate the applicant's financial qualifications. In Appendix C, the Commission distinguishes between two classes of applicants: those which are established organizations (App C.I) and those that are newly formed entities (App C.II). PFS is a newly formed entity without an established operating record and thus its financial qualifications should be reviewed under the criteria established in Appendix C.II.

> As to the source of construction funds, Appendix C.II requires the applicant to specifically identify the source or sources upon which the applicant relies for the funds necessary to pay the cost of constructing the facility, and the amount to be obtained from each. With respect to each source, the applicant should describe in detail the applicant's legal and

> financial relationships with its stockholders, corporate affiliates, or other (such as financial institutions) upon which the applicant is relying for financial assistance.

When the Applicant relies on parent companies or corporate affiliates as a source of funding, it must also demonstrate "the financial capability of each such company or affiliate to meet its commitments to the applicant" and "[o]rdinarily, it will be necessary that copies of agreements or contracts among the companies be submitted." Id. Finally, the Applicant should "include in its application a statement of its assets, liabilities, and capital structure as of the date of the application." 10 CFR Part 50, App C.II. While Appendix C recognizes that construction costs will vary by the type of facility, it requires construction costs "be itemized by categories of cost in sufficient detail to permit an evaluation of its reasonableness." Id. App. C.I.[9]

The Applicant's financial qualifications to carry out the activities it seeks under this license application and the information the Applicant submitted to demonstrate its financial qualifications are deficient in the following respects:

1. Information in the application about the legal and financial relationship among the owners of the limited liability company (*i.e.* the license Applicant) is appallingly deficient. The Applicant merely states it is "a limited liability company owned by eight U.S. utilities which serve more than 17 million customers in 21 states." LA at 1-3. These owners are not explicitly identified, nor are their relationships

[9] Appendix C generally treats estimates of construction costs the same for established organizations and newly formed entities. 10 CFR § 50, App. C.II.A.1.

discussed, as required by 10 CFR §§ 50.33(c)(2) and 50.33(f) and Appendix C, § II. Instead, the only information provided by the Applicant which might conceivably be relevant to this requirement is a list seven nuclear utility officials who serve as Directors of PFS as of June 1997. LA at 1-10. It is not clear whether these individuals represent the owners of the business, or if so, what happened to the eighth owner. This extremely limited information does not even begin to satisfy the NRC's financial qualifications to engage in the Part 72 activities it seeks under this license application.

2. The Applicant is a limited liability company organized under the laws of Delaware. LA at 1-4. There is no evidence that the Applicant is anything more than a shell company devoid of any assets or capital. As part of the Applicant's demonstration of financial qualifications, the Applicant must be required to submit a current statement of its assets, liabilities, and capital structure. *See* 10 CFR Part. 50, App. C.II.

3. The Applicant has not taken into account the difficulty of allocating financial responsibility when casks are centrally stored and owned by different entities. Further, the Applicant also does not address its financial responsibility as the "possessor" of spent fuel casks. The Applicant assumes that the "owner" of the spent fuel will retain responsibility for the fuel. However, the proposition that the originating reactor licensee retains assumption of responsibility for the fuel even when it is in the Applicant's possession create numerous problems. The Applicant intends that its facility will provide storage of spent fuel from commercial nuclear power reactors that are located throughout the United States. LA at3-1. A complex and unworkable liability

scheme arises from the storage of fuel casks owned by a myriad of licensees. For example, how will liability, response and cleanup be allocated should there be an accident involving nuclear materials or a spill or release of nuclear materials. The potential for accidents given the surrounding hazardous military activities is not inconsequential. *See* State of Utah's Petition to Intervene, pp. 4, 13. Furthermore, the casks will be located less then four feet apart and will be "owned" by different licensees. This will make it exceedingly difficult to allocate liability and responsibility. The Applicant must address these issues as part of its financial qualification to undertake the licensed activities. 10 CFR § 72.22(e)

4. As the Licensing Board has observed, reasonably accurate cost estimates are important safety requirements under the financial qualifications regulations, because " a licensee in financially straitened circumstances would be under more pressure to commit safety violations or take safety 'shortcuts' than one in good financial shape." Gulf States Utilities Co. (River Ben Station, Unit 1), LBP-95-10, 41 NRC 460, 473 (1995), *quoting* Gulf States Utilities Co. (River Ben Station, Unit 1), CLI-94-10, 40 NRC 43, 48 (1994). However, the Applicant has failed to show that it has the necessary funds to cover the "[e]stimated operating costs over the planned life of the ISFSI" as required by 10 CFR § 72.22(e)(2) because the application is devoid of specifics about financial information, including cost estimates.

For example, the License Application estimates total construction costs at $100 million, "including site preparation; construction of the access road, administration

building, visitors center, security and health physics building, operations and maintenance building, canister transfer building and storage pads; procurement of canister transfer and transport equipment; and transportation corridor construction." LA at 1-5. Similarly, in the ER, the Applicant aggregates all direct costs into one lump sum of $100 million for "initial costs to site the facility, the costs to engineer and construct the facility and annual costs associated with the Tribal lease, maintenance, operation, transportation, security, license fees, and taxes." ER at 7.3-1, ER Table 7.3-1. The Applicant lists total life cycle cost for the facility and its operation at $1.526 billion (40 year life) or $1.125 billion (20 year life). Id.

Such vague and generalized cost estimates are insufficient to satisfy 10 CFR Part 50, App.C. § II, which requires that construction costs must be itemized by categories of cost in sufficient detail to permit an evaluation of its reasonableness. Indeed, the Applicant's representations are meaningless, because they cannot be evaluated unless each portion of the construction costs is specified and the basis for each cost estimate is provided.

Moreover, PFS appears to have significantly underestimated construction costs. In 1993, the Department of Energy (DOE) considered locating a monitored retrievable storage installation (MRS) at the same Skull Valley Reservation. DOE proposed a dry cask storage MRS with a capacity of 15,000 MTU (42 USC § 10168(d)(4)), half the quantity of spent fuel proposed by the Applicant. DOE estimated the construction cost, in 1992-93 dollars, of a dry cask storage facility at $530 million. Skull Valley Band of

Goshutes MRS brochure, attached hereto as Exhibit 6. The Applicant's 1997 construction cost estimates are less than one fifth of DOE's 1993 estimates although the Applicant proposes to store twice as much spent fuel as the DOE MRS proposal. Itemization of costs and justification for the cost estimates are essential to estimate cost estimates.

5. Part of the Applicant's plan to obtain funding for its operations includes "equity contributions from PFSLLC members pursuant to Subscription Agreements." LA at 1-4. The Applicant indicates that each of the eight consortium members will contribute equity contributions of an additional $6 million each for a total of $48 million. LA at 1-5. However, the application does not include pertinent portions of subscription agreements or other legally binding commitments to give any assurance that the Applicant will obtain the necessary funds or even the initial $48 million. When the Applicant relies on its owner members (or its parent companies or corporate affiliates) to provide a source of funding, the Applicant must submit a copy of each Subscription Agreement between PFS and its member companies. *See* Part 50, Appendix C.II.

Moreover, the amount of equity contributions is dependent upon the number of members in the limited liability company; thus the amount of available funds is affected by any withdrawing utility member. In fact, the number of member utilities has already decreased since the formation of the consortium. PFS was initially organized with eleven utility members. The application itself mentions eight members but only identifies seven board members; apparently each board member represents a consortium

member. The Applicant must demonstrate financial qualification prior to licensing the facility--not at some future date. *See* Claiborne, 44 NRC at 403. The Applicant's failure to document its funding source is one reason why this Applicant has not shown it either possesses the necessary funds or has reasonable assurance of obtaining or even retaining necessary funds for the activities sought under its license application. *See* 10 CFR § 72.22(e)

6. The Applicant also plans to raise additional capital through "Service Agreements" with customers. LA at 1-5. Based on the Applicant's own estimates, at a minimum it must raise an additional $52 million just to complete construction. The Applicant must demonstrate "reasonable assurance of obtaining the necessary funds" not simply identify a mechanism for obtaining funds. Furthermore, the terms of the service agreements are not even provided, including items such as costs, periodic terms, liability, performance, and breach clauses.

To show it has reasonable assurances of obtaining funds, the Applicant should document an existing market and the commitment of a sufficient number of service agreements to fully fund construction of the facility. The Applicant implies that 15,000 MTU of storage commitments would be adequate to fund construction. LA at 1-5. The Applicant has not substantiated how storage commitments for 15,000 MTUs would be adequate. In addition, there must be sufficient funds committed for operation, decommissioning, and contingencies for the number of casks contracted to fund construction.

7. The Applicant also mentions an option to finance construction costs through debt financing secured by service agreements. LA at 1-6. Similarly, debt financing will not be viable until a minimum value of service agreements is committed. Moreover, the Applicant will not be capable of securing debt financing without providing supporting documentation, including the service agreements. Thus, the Applicant failed to show that it has reasonable assurance of obtaining necessary funds through debt financing.

8. The License Application states that "on-going operations and maintenance costs . . . will be paid by the customer on an annual basis." LA at 1-6. Although the Applicant states that it will require financial information from its "customers," Id., it has not addressed funding contingencies in the event a customer breaches the service agreement or becomes insolvent while the customer's spent fuel is stored at the ISFSI. The Applicant does not provide reasonable assurance that adequate funds are available to ensure the safe operation and maintenance of spent fuel storage in the event of insolvencies or even while disputes are being resolved.

F. Inadequate Training and Certification of Personnel.

CONTENTION: Training and certification of PFS personnel fails to satisfy Subpart I of 10 CFR Part 72 and will not assure that the facility is operated in a safe manner.[10]

BASIS: "Under Subpart I, operation of equipment and controls that have been identified as important to safety in the SAR and in the license must be limited to trained and certified personnel or be under the direct visual supervision of an individual with training and certification in the operation." Further, under 10 CFR § 72.192, the applicant for a license shall establish a program for training, proficiency testing and certification of ISFSI or MRS personnel. This program must be submitted to the Commission for approval with the license application." Finally, under 10 CFR § 72.194, the physical conditions of operators must ensure that operational errors are not caused. Conditions that might cause impaired judgment must be considered in the selection of personnel.

PFS organizational structure, including responsibilities and qualifications is laid out in Section 9.1 of the SAR. The pre-operational testing program is discussed in section 9.2; the testing program in section 9.3. These sections do not satisfy the minimal NRC requirements and do not provide assurance the facility will be operated in a safe manner.

1. Training and certification program. Contrary to these regulations, the Applicant has not explicitly defined a training and certification program. A training, certification and testing program has not been submitted with the license, and a listing of

[10] This contention is supported by the Declaration of Marvin Resnikoff, attached hereto as Exhibit 2.

physical conditions that would bar a person from employment in specific positions has not been defined.[11]

2. Physical condition of operators. The SAR has no discussion regarding the physical condition of operators, as required by 10 CFR § 72.194. A potential operator should be required to pass a medical examination that certifies the operator has the physical ability to carry on duties of his/her specific job and has no physical impairments or mental conditions that would adversely affect his/her performance or cause operational errors that would endanger public health and safety.

3. Trained and certified personnel. The minimum qualification of personnel are detailed in SAR § 9.1.3 For example, the general manager must have ten years of experience within the nuclear power industry (though up to four years could be academic training) and must have a BA. The Lead Mechanic/Operator must have a high school diploma and a minimum of six years experience in mechanical maintenance. The Lead Mechanic/Operator will become, according to the SAR, a certified storage facility operator prior to facility operation. The Lead Nuclear Engineer shall have a minimum of a BS in nuclear engineering and four years experience in the nuclear power industry. Id.

The Applicant has not shown that these qualifications are sufficient to guarantee that the facility will be operated safely. For example, neither the General Manager nor Operators are required to have any experience in dry storage operations. The details of instruction courses, training programs or work on simulation facilities is not laid out in

[11] This contention is supported by the Declaration of Marvin Resnikoff, attached hereto as Exhibit 2.

detail. No tests are specified for certification, that is, evidence the trainee has successfully manipulated real or simulated equipment. The Applicant has not specified any written examinations and operating tests, including the items that would be on such a test. The Applicant has not specified the terms of qualification and revocation of operators license, provisions for requalification, and enforcement. The Applicant merely states that "each member of the site staff involved with important safety activities will be required to meet the minimum qualifications of the License," without stating these minimum qualifications and how they will assure the public health and safety. SAR at 9.1-27. The Applicant promises "Programs for additional site familiarization training and ongoing training and retraining" without stating the specific details of the training program and the minimum passing grade for certification. Id. Specific operational tests are stated on SAR 9.2-5 without indicating the minimum terms for passing the course. A training program is mentioned in Section 9.3 of the SAR, but it constitutes nothing more than a promise without specific details. Thus, it is inadequate to satisfy the regulations.

G. Quality Assurance.

CONTENTION: The Applicant's Quality Assurance ("QA") program is utterly inadequate to satisfy the requirements of 10 CFR Part 72, Subpart G.[12]

Basis: NRC regulations at 10 CFR § 72.24(n) require each applicant for an ISFSI license to submit "a description of the quality assurance program that satisfies the requirements of subpart G to be applied to the design, fabrication, construction, testing, operation, modification, and decommissioning of the structures, systems, and components important to safety." Subpart G sets forth numerous quality assurance requirements, including the requirement that the description of the QA program must discuss which requirements of Subpart G are applicable, and explain how they will be implemented. 10 CFR § 72.140(c).

The description of the QA program submitted by PFS in support of its license application falls woefully short of this standard. Private Fuel Storage L.L.C., Quality Assurance Program Description (August 1996) (hereinafter "QAPD"). The QAPD constitutes nothing more than a general summary of PFS's intentions to implement a QA program. Moreover, contrary to the requirement of 10 CFR § 72.24(140)(c) that the applicant must describe "how" the program is to be implemented, the QAPD contains not a shred of information about how PFS intends to implement the general goals set forth in the QAPD. Nor does it address the unique QA problems raised by this license application, relating to the Applicant's lack of control over procurement of materials and packaging of

[12] This contention is supported by the Declarations of Lawrence A. White, attached hereto as Exhibit 1 and Marvin Resnikoff, attached hereto as Exhibit 2..

spent fuel by nuclear power plant licensees, and the ISFSI's lack of design features for inspection of canisters and fuel cladding.

1. Lack of detail. The proposed ISFSI is a huge and complicated operation that will accept thousands of casks, from all over the country, and store them for at least 20 years. A QA program description for such a facility should contain enough detail to demonstrate how the Applicant can and will conduct a QA program that complies with the numerous quality assurance standards set forth in Subpart G. The QAPD submitted by the Applicant, however, contains only the sketchiest information regarding the Applicant's intentions. In effect, it constitutes a list of broad goals for quality assurance corresponding to the regulatory requirements, rather than a description of the means by which quality assurance will be achieved. Virtually no information is provided about the nature of the ISFSI or its unique operations. Instead, the QAPD is a "one size fits all" document, apparently intended to be vague enough to cover any licensee or operation related to spent fuel handling. Indeed, the QAPD originally was submitted in 1995 under the NRC's Part 71 transportation regulations, by the Mescalero Apache tribe. The fact that PFS merely changed the name of the Applicant and made virtually no changes to the QAPD for an entirely new organization and operation, vividly illustrates the non-specific and non-informative nature of the QAPD. As such, it is completely inadequate to "provide sufficient detail. . . to enable staff to determine its adequacy." NUREG-1567, Draft Standard Review Plan for Spent Fuel Dry Storage Facilities, USNRC at 15-1 (1996).

For instance, 10 CFR § 71.146 establishes requirements for design control. Subsection (a) requires the applicant to:

> establish measures to ensure that applicable regulatory requirements and the design basis, as specified in the license application for those structure, systems, and components to which this section applies, are correctly translated into specifications, drawings, procedures, and instructions. These measures must include provisions to ensure that appropriate quality standards are specified and included in design documents and that deviations from standards are controlled. Measures must be established for the selection and review for suitability of application of materials, parts, equipment, and processes that are essential to the functions of the structures, systems, and components which are important to safety.

The Applicant provides virtually no information about how this requirement will be met, other than to state that "design control procedures" will be prepared. Id. QAPD at 5. The QAPD says nothing about how design reviews will be conducted under these procedures, or by whom, other than "by qualified personnel other than those performing the design." Id. There is no description, for instance, of the structure or content of the QA organization, or who in the QA organization will fulfill this function. Thus, the description is utterly inadequate to satisfy the regulations. For instance, while the QAPD briefly refers to training of QA program employees, it does not specify the type of training and the level of training required for specific Quality Assurance functions. Id. at 4. Moreover, it fails to identify what training will be provided for all types of personnel as a QA measure. Thus, it lacks sufficient detail to comply with 10 CFR § 72.144(d).

Similarly, while the QAPD program states that the QA program will be reviewed at established intervals, it does not specify the minimum review intervals nor does it define what will trigger an earlier review (*e.g.*, implementing corrective action on the same

activity, etc.). Id. at 4.

The rest of the QAPD is written in the same way, substituting a statement of the QAPD's goals for a description of the actual program.

2. Lack of quality control. The QAPD is completely inadequate to satisfy the requirements of 10 CFR §§ 72.154 (control of purchased material, equipment and services), 72.156 (identification and control of materials, parts and components) and 72.166 (handling, storage, and shipping control). PFS's cursory discussion of these requirements, in Sections 7, 8, and 9 of the QAPD, completely fails to address the specific quality control issues raised by the proposed ISFSI.

The nature of the proposed ISFSI and its operation, as proposed by PFS, poses unique QA problems. Ordinarily, for an ISFSI operated by a single reactor licensee, all of the operations affecting storage of spent fuel are controlled by the licensee. The licensee also procures and owns all of the materials involved. In the case of the proposed ISFSI, although the SAR is not clear, it is Petitioner's understanding that PFS will own the shipping casks, canisters, and associated materials. Nevertheless, PFS will not control the packaging of spent fuel inside the casks and canisters. Instead, numerous utilities with their individual team of welders and other staff will load the canisters for transport to the proposed ISFSI. Here, PFS will be accepting spent fuel packaged at 19 different nuclear plants, by up to 19 different sets of employees, under up to 19 different sets of procedures.

While quality in the operations and the materials used in the packaging of the canisters is extremely important to the safe handling and storage of spent fuel, the license

application gives the Applicant no control over these operations. No attention is given in the QAPD or Chapter 11 of the SAR to the procurement of materials or the training and quality control of so many technicians beyond the control of the storage facility operators. Instead, this responsibility seems to rest with the cask manufacturer and the nuclear power plant licensee.

For instance, 10 CFR § 72.154(a) requires that:

> The licensee shall establish measures to ensure that purchased material, equipment and services, whether purchased directly or through contractors and subcontractors, conform to the procurement documents. These measures must include provisions, as appropriate, for source evaluation and selection, objective evidence of quality furnished by the contractor or subcontractor, inspection at the contractor or subcontractor source, and examination of products upon delivery.

PFS's extremely brief discussion in Section 7 of the QAPD gives no indication whatsoever of how PFS's QA program will deal with the significant problem that, while PFS has responsibility for maintaining the integrity of the casks during transfer and 20-plus year storage, it has no apparent control over their purchase or manufacture. This appears to be left to the nuclear power plant licensees.

The QAPD also fails to address PFS's measures for satisfying the requirements of 10 CFR § 72.156. Among other things, this regulation requires that "identification and control measures must be designed to prevent the use of incorrect or defective materials, parts, and component." Id. Section 8 of the QAPD vaguely calls for paper documentation that identifies materials, parts and components, and a "means of identification." But it says nothing about the means PFS intends to "control" its operation to prevent the use of

degraded or substandard parts, as also required by the regulation. This is an extremely grave omission, in light of the recent Demand for Information issued by the NRC to Sierra Nuclear Corporation, manufacturer of the TranStor casks for defective cask construction, EA 97-411 (October 6, 1997) ACN # 9710100120. *See also* description of defective or degraded cask contents in Contention J (Inspection and Maintenance of Safety Components) whose Basis 1 (Regulatory Violation) is herewith incorporated by reference.

The QAPD also fails to address the important question of how welds on shipping casks and canisters will be inspected. These welds should be inspected using ultrasound, to ensure that the welds are secure. This is a standard technique recommended by the NRC. There is no indication as to whether this inspection will be performed by the licensee, the cask manufacturer, PFS, or anyone else. As a result, this important QA operation may fall through the cracks, in violation of 10 CFR § 72.158.

The QAPD completely fails to address PFS's measures for controlling the quality of handling, storage, and shipping of spent fuel casks to prevent damage or deterioration, as required by 10 CFR § 72.166. For instance, improper handling of fuel during packaging at the originating nuclear power plant could lead to fuel degradation and reduction in the safety margin during storage. PFS proposes no specific QA measures for verifying the adequacy of these handling measures. The QAPD is completely vague as to whether and how it will conduct inspections on receipt of the casks. The QAPD mysteriously states that receipt inspection will be performed "consistent with importance and complexity," but fails to define those terms or state which components satisfy them. QAPD at 12. From the

SAR, it appears that PFS intends to accept the casks as-is, with only the most cursory physical inspection to the outside of the casks. Id. § 5.1.4.2. Moreover, as discussed in Contention J (Inadequate Inspection and Maintenance of Safety Components), PFS has no means of verifying the adequacy of handling at the originating nuclear power plant by opening the canisters or of verifying that the casks have been properly packaged. Thus, PFS's QAPD is completely inadequate to describe how the Applicant will fulfill its responsibility under 10 CFR § 72.154 for control of purchased material, and equipment and services.

3. Inconsistency with SAR. The QA program description in the SAR is inconsistent with the description in Docket 71-0829. For example, QA Docket 71-0829 describes a different organization for PFS than that described in the SAR. *Compare* QA Docket 71-0829 at 3 with SAR Figures 9.1-1, 9.1-2, and 9.1-3. For example, the QA Docket 71-0829 identifies a Business Services Unit, NRC Liaison, and a Human Resources Development Group not identified in the SAR. Id. Similarly, the SAR shows a number of positions and company units, such as a transportation specialist and a safety review committee, not described in the QA Docket 71-0829. Id. There is no attempt to show how or whether the positions and company units described in these two documents correspond to each other, or why the organization of the same company is described so differently in these two documents.

Similarly, the QA Docket 71-0829 indicates that for organizational independence the QA organization shall have direct access to the Board of Directors. QA Docket 71-0829 at

3. However, the SAR makes no reference to a Board of Directors but refers to a Board of Managers. SAR at 11.1-1, -3. QA Docket 71-0829 Figure 1 depicts the QA organization as reporting to the Board of Managers and indicates that the Board of Managers is responsible for budget approval, financial oversight, step IV planning, liaison to utilities, and business development. If the Board of Managers responsible for cost and schedule referred to in the SAR is the group to which the QA organization will report, organizational independence may be jeopardized. As stated in 10 CFR § 71.103(d), "[t]he persons and organizations performing quality assurance functions shall report to a management level that assures that the required authority and organizational freedom, including sufficient independence from cost and schedule, when opposed to safety considerations, are provided."

4. Failure to Demonstrate Independence of QA Organization

The SAR describes the Applicant's personnel organization in three stages: (1) pre-licensing, (2) licensing and construction, and (3) operational. SAR figures 9.1-1, 9.1-2, and 9.1-2. The QA responsibilities of the Board of Managers, the Architect/Engineer, and the QA Committee during the pre-licensing stage. SAR at 11.1-1 to -3, SAR figure 9.1-1. Although the SAR indicates that the "QA Committee is an independent organization reporting to the Board of Managers" and it "has the organizational freedom and authority to identify quality problems; to stop unsatisfactory work," the SAR fails to describe the interrelationships between the Architect/Engineer group and the QA Committee and how the relationship enhances QA. *See e.g.*, SAR at 11.1-2. In addition, the SAR fails to identify who is responsible for pre-licensing "day to day activities, costs, or schedules" and how the

organizational structure ensures QA in quality- and safety-related activities.

In addition, although the SAR briefly describes broad QA responsibilities for the Board of Managers and Lead QA Technician, it fails to provide any meaningful description of the licensing and construction, and operational functional responsibilities, interrelationships, and various authority for performing quality and safety related activities. *See e.g.*, SAR at 11.1-3. Pre-licensing and pre-construction planning is vital to the success of an operation. However, construction, operation, and decommissioning QA are also critical to ensuring quality and safe activities when spent fuel is onsite. Moreover, it is impossible to evaluate the QA program without an understanding of the construction, operation, and decommissioning duties for each position or group and their interrelationships with other personnel.

Further, the QA Docket 71-0829 states that "[m]anagement of other organizations participating in the Quality Assurance program shall regularly review the status and adequacy of that part of the program which they are executing." Id. Allowing responsible individual organization management to determine the adequacy of the QA over their own programs does not allow independent oversight nor objectivity in establishing QA procedures. QA Docket 71-0829 at 4. Thus, contrary to the requirements of 10 CFR § 72.142, the QAPD fails to demonstrate the independence of the QA organization.

H. Inadequate Thermal Design.

CONTENTION: The design of the proposed ISFSI is inadequate to protect against overheating of storage casks and of the concrete cylinders in which they are to be stored.[13]

BASIS: Pursuant to 10 CFR 72.122(b), structures, systems and components of an ISFSI must be designed to accommodate the effects of, and be compatible with, site characteristics and environmental conditions associated with normal operation. Section 72.128(a) also requires that spent fuel storage systems such as the proposed ISFSI must be designed to "ensure adequate safety under normal and accident conditions." Among other things, these systems must be designed to include "[s]uitable shielding for radioactive protection under normal and accident conditions," and "[a] heat-removal capability having testability and reliability consistent with its importance to safety." 10 §§ CFR 72.128(a)(2) and (4).

PFS has failed to demonstrate that the design of the proposed ISFSI is adequate to accommodate the high temperatures that may be expected at the site. In particular, PFS has failed to demonstrate adequate design temperatures for storage casks and for the concrete cylinders in which the casks are to be stored. Nor does PFS propose design features to assure that the casks and concrete will not be overheated. Both the cladding in the storage casks and the concrete cylinders constitute shielding for radioactive

[13] This contention is supported by the Declaration of Marvin Resnikoff, attached hereto as Exhibit 2.

protection which could be degraded under high temperatures, thus posing an undue safety risk. Therefore, PFS does not meet the requirements of 10 CFR §§ 72.122(b) or 71.128(a).

1. Temperature specifications for storage casks

According to the SAR, the record high temperatures in Skull Valley range from 105 ºF to 109 ºF. SAR at 2.3-5. PFS has established a site design ambient temperature of 110 ºF. SAR at 4.2-15. However, PFS is planning to use HI-STORM and TranStor storage casks, which are designed for lower ambient temperatures. The TranStor cask is designed for ambient temperatures of 75ºF, and off-normal temperatures of negative 40ºF and 100 ºF. TranStor SAR, Rev. B at 4-4. The Holtec cask is designed for a daily average ambient air temperature of 80ºF, and off-normal conditions of negative 40ºF and 100ºF. HI-STORM TSAR Rev 2 at 2.2-17.

PFS recognizes that the off-normal design temperature of 100ºF is below PFS's design ambient temperature of 110ºF. SAR at 4.2-15. However, PFS argues that the 100º F condition "represents a maximum daily average temperature over a period of several days and nights required for the system to reach thermal equilibrium." SAR at 4.2-15. PFS contends that, while daily ambient temperatures could exceed 100ºF, the average daily temperature would not exceed 100ºF, averaging day and night temperatures. SAR at 4.2-15. In support of this assertion, PFS cites the maximum average daily ambient temperature of 93.2ºF for cities in Utah nearest the site. SAR at 4.2-15.

PFS's analysis is faulty, for several reasons. First, temperatures in unnamed cities somewhere in Utah do not necessarily correspond to the conditions in Skull Valley. PFS should provide information on actual temperatures at the Skull Valley site, using measurements taken at the distance from the ground that is comparable to the location of intake vents on the storage casks, where air will be drawn into the casks.

Second, PFS's projection that average daily temperatures will not exceed 100ºF fails to take into account the heat stored and radiated by the concrete pad and by the concrete cylinders in which each cask will be stored. These massive concrete structures will serve as reservoirs that trap and radiate heat throughout the day and night, thus having a potentially significant effect on average ambient temperatures.

Third, in projecting ambient temperatures, PFS fails to take into consideration the heat generated by the casks themselves. The TranStor casks are placed at a center-to-center distance of 15 feet. Since the diameter of each TranStor cask is 11.3 feet, the spacing between casks on the pad is only 3.7 feet. TranStor SAR, Rev. B at 1-17. The Holtec cask is 11 feet in diameter and the spacing between Holtec casks is therefore 4 feet. Holtec HI-STORM 100 TSAR Rev. 2 at 1.2-1. Given the close proximity of the casks, it is likely that additional heat from an adjacent cask would increase the external and internal temperatures of the concrete storage cylinders, and therefore the maximum cladding temperature.

Finally, PFS has not taken into account the thermal impact of the temperature differential between the level of the concrete pad and the level of the tops of the storage

casks, 15 feet above. Because of the heat-retaining nature of the concrete pad, the air temperature near the ground will be higher than the temperature 15 feet above. This will have an impact on the ventilation system for the casks, which relies on convection, in which cool air is drawn into the cask inlets and is heated by the inner canister, causing the air to rise. This "chimney effect" depends on a difference in temperature between the incoming and outgoing air. If the temperature of air going into the vents is higher than the temperature of the air 15 feet off the pad, the buoyancy and velocity of air through the ducts is reduced. Air moving more slowly through the ducts, and at a higher temperature, will cool the canisters more slowly than cooler air. Thus, the design temperature for the casks (and the cladding inside them) may be exceeded due to the reduced effectiveness of convection cooling.

PFS's design of the ISFSI is inadequate because it fails to take into account these factors in establishing the temperature-related design limits for storage casks, or to establish measures to ensure that the manufacturer's design limits will not be exceeded during storage. PFS should be required to perform the requisite calculations and re-evaluate the temperature-related design limits of the facility.

2. Temperature limits for concrete storage cylinders

In a "Request for Additional Information" from Lawrence E. Kokajko, NRC, to William J. McConaghy, Sierra Nuclear Corporation, December 17, 1996, (hereafter called

RAI), the NRC states its policy on temperature limits for the concrete structures in which storage casks are housed. The Staff recommends a maximum allowable temperature of 150ºF for normal operation for bulk concrete (assumed here to be inner concrete), 200ºF for local areas, 350ºF and for accident or other short-term periods. The purpose of these limits is to assure that the concrete structures housing the casks, which serve as radiation shields, do not degrade and crack due to unacceptably high heat levels. RAI at 9, 10.

Information submitted by Sierra Nuclear Corporation (SNC) and Holtec in support of their applications for Certificates of Compliance shows that projected temperatures for concrete either exceed or are very close to the NRC's recommended limits, thus compromising the integrity of the concrete. In fact, these calculations probably underestimate the concrete temperatures, because they do not appear to take into account the heat generated by the casks themselves and the storage pads.

TranStor. For example, at page 4-1 of the TranStor SAR, SNC presents concrete temperature calculations, based on a worst-case temperature of 125° with maximum solar load, lasting for 12 hours. The resultant temperatures in degrees Fahrenheit are shown in the Table below:

TranStor Cask (ºF)

Case	Ambient Conditions	Solar Load	Outer Concrete	Inner Concrete	Max Cladding
Base	75	No	85	188	664
Off-Normal	100	Yes	141	222	688

12 Hour Max Thermal Load	125	Yes	190	257	712

The Table shows that under off-normal conditions, the inner concrete temperature of 222ºF exceeds the 200ºF limit recommended by the NRC. Moreover, the off-normal temperature of 141ºF for outer concrete is close to the NRC's recommended limit of 150ºF. The NRC staff expressed concern about these temperatures in the RAI. It is stated that the staff would allow use of TranStor provided PFS uses a different concrete mix, as specified in an American Concrete Institute publication, ACI-349, Appendix A. RAI at 10. However, to Petitioner's knowledge, this issue remains unresolved.

Moreover, SNC's calculations only take into account the contribution of solar heat, and do not appear to take into account the heat contributed by the casks themselves. As discussed above, the heat input of the casks themselves is likely to be significant. It may raise the heat level of the concrete above acceptable levels, even using the concrete mix specified by the staff. Finally, SNC does not discuss the problem of heat build-up in the concrete structures, a likely result of the reduced effectiveness of convection cooling.

HI-STORM. Holtec presents the following results at pages 4.4-32, 11.1-8, and 11.1-9 of the TSAR for the HI-STORM 100 cask:

Hi-Storm Cask (ºF)

Case	**Ambient Conditions**	**Solar Load**	**Outer Concrete**	**Inner Concrete**	**Max Cladding**

Base	80	Yes	146	264	632
Off-Normal	100	Yes	166	287	652
12 Hour Max Thermal Load	80	Yes	150	288	656

These temperatures are clearly above the NRC recommended values. At the very least, they would require a different concrete formulation, as discussed in the NRC Staff's December 17, 1996 letter to SNC. Moreover, like SNC's calculations, Holtec's calculations are nonconservative, thus suggesting that even a different concrete formulation may be an insufficient design measure. Although Holtec does consider an array of casks in evaluating concrete temperatures, its equations only account for reduced air flow in the array, and do not consider the heat generated by the casks themselves. Nor does Holtec discuss the reduced effectiveness of convection cooling caused by relatively high air temperatures near the concrete pad.

Accordingly, PFS has not demonstrated that concrete structures for storage of spent fuel are design to withstand the temperatures that can be expected at the proposed ISFSI, or that it has taken measures to ensure protection of the concrete from excessive temperatures.

I. Lack of a Procedure for Verifying the Presence of Helium in Canisters.

CONTENTION: The design of the proposed ISFSI fails to satisfy 10 CFR §§ 72.122(f) and 10 CFR § 72.128(a), and poses undue risk to the public health and safety, because it lacks a procedure, or any evidence of a procedure, for verifying the presence of helium inside spent fuel canisters.[14]

BASIS: The general design criteria for ISFSIs require that "[s]ystems and components important to safety must be designed to permit inspection, maintenance, and testing." 10 CFR § 72.122(f). NRC regulations at 10 CFR § 72.128(a)(1) also require that spent fuel storage systems must be designed with a capability to test and monitor components important to safety. *See also,* Reg. Guide 3.48, § 4.7, which states that:

Spent fuel or high-level radioactive waste handling facilities will be needed at the facility site for some of all of the following functions: receiving and inspection of loaded shipping casks, cask unloading, spent fuel or high-level radioactive water transfer and examination, fuel assembly-disassembly, placement of spent fuel in a container, container sealing and testing, spent fuel or high-level radioactive waste container short-term storage, shipping cask decontamination, SSSC and drywell loading and preparation for storage, SSSC transfer to storage, fuel or high-level radioactive waste container removal from storage site to shipping cask, and damaged fuel element containerization.

[14] This contention is supported by the Declaration of Marvin Resnikoff, attached hereto as Exhibit 2.

In dry cask transportation and storage, helium is injected into the canister and the cask as a coolant. The presence of helium is important to protect the contents of the canister from overheating, corrosion, and oxidation of uranium.

PFS's SAR indicates that during cask transfers, PFS intends to sample the inside of the casks for "gas," presumably including helium. SAR Table 5.1-1, item 6 (HI-STORM), Table 5.1-2, item 6 (TranStor). However, PFS appears to have no measures for testing the helium content inside the canisters. Because the helium will be expected to play a critical role in protecting the fuel from degradation over a 20-plus year storage period and during transportation to a final repository, it is important that PFS have and implement some means for verifying the presence of helium in the canister.

Moreover, the nature of the materials and operations involved in packaging fuel for shipment to the ISFSI create significant opportunities for human error in filling the casks with helium, thus making such a procedure all the more important. Under the "Operating Procedures" for the TranStor cask, (*see* TranStor SAR at 7-11), the canister is first evacuated and then backfilled with "99.9%" pure helium. Since this filling is being done while the canister is exposed to our normal atmosphere, it is possible that some air (containing oxygen) could leak in with the helium, perhaps due to carelessness or a slightly leaky helium hose connection. In this connection, it is important to recall that there is a vacuum in the canister that may have the effect of sucking gases other than helium into the canister. Because of the potential for error in the filling operation, and because PFS lacks

control over the filling operation, it is all the more important that PFS have the capability to open the cask and check for the presence of helium.

Another reason to require inspection of canisters for helium arises from the fact that the spent fuel will be shipped, perhaps thousands of miles, from reactors to the ISFSI. This stands in contrast to ISFSIs located on or near the sites of the reactors. During transportation, the welding on canister lids may loosen, thus allowing helium to escape.

J. Inspection and Maintenance of Safety Components, Including Canisters and Cladding.

CONTENTION: The design of the proposed ISFSI fails to satisfy 10 CFR §§ 72.122(f) and 72.128(a), and poses undue risk to the public health and safety, because it lacks a hot cell or other facility for opening casks and inspecting the condition of spent fuel.[15]

BASIS: Most dry cask storage facilities are located on the sites of nuclear reactors, where there is a spent fuel pool that can be used for inspection and repairs to the contents of dry storage casks. In the case of the proposed ISFSI, which would constitute a brand new facility, there is no existing spent fuel pool or hot cell that can be relied upon. Moreover, PFS has no plan to include one in the design. The SAR simply states that all casks are expected to be properly packed, and that any defective or contaminated casks will be returned to the originating shipper. Technical Specifications at TS-9. PFS's failure to provide a spent fuel pool where canisters and fuel cladding can be inspected and repaired violates NRC regulations. Moreover, a hot cell is needed to protect workers and the public against the undue risks caused by the handling and storage of spent fuel.

1. Regulatory violation. The general design criteria for ISFSI's require that "[s]ystems and components important to safety must be designed to permit inspection, maintenance, and testing." 10 CFR § 72.122(f). NRC regulations at 10 CFR § 72.128(a)(1) also require that spent fuel storage systems must be designed with a capability

[15] This contention is supported by the Declaration of Marvin Resnikoff, attached hereto as Exhibit 2.

to test and monitor components important to safety. *See also* Reg. Guide 3.48, § 4.7, which states that:

> Spent fuel or high-level radioactive waste handling facilities will be needed at the facility site for some of all of the following functions: receiving and inspection of loaded shipping casks, cask unloading, spent fuel or high-level radioactive water transfer and examination, fuel assembly-disassembly, placement of spent fuel in a container, container sealing and testing, spent fuel or high-level radioactive waste container short-term storage, shipping cask decontamination, SSSC and drywell loading and reparation for storage, SSSC transfer to storage, fuel or high-level radioactive waste container removal from storage site to shipping cask, and damaged fuel element containerization.

The Commission emphasized the importance of providing measures for inspection and maintenance of critical safety components in the course of proposing them in 1978:

> The large inventory of radionuclides in an ISFSI represents a potential hazard to public health and safety. Storage conditions must provide an environment which will insure the long-term integrity on [sic] the fuel cladding as the primary containment for the radioactive materials contained in spent fuel. . . . .
>
> To assure the long-term integrity of the stored spent fuel, the storage racks and other important components of an ISFSI, there must be provisions for periodic inspection and surveillance of critical components.

Proposed Rule, Storage of Spent Fuel in an Independent Spent Fuel Storage Installation (ISFSI), 43 Fed. Reg. 46,309, 46,310 (October 6, 1978) (emphasis added). Clearly, the canister and cladding which hold the spent fuel, and protect against the release of radiation, constitute such critical safety components.

Moreover, the NRC's conclusion regarding the safety of dry cask storage for extended periods of time is based on the presumed ability to inspect the condition of spent fuel during storage. In 1988, in amending Part 72 to add standards for the design of

Monitored Retrievable Storage ("MRS") facilities, the Commission prepared an Environmental Assessment which concluded that dry cask storage is safe for extended periods of time. NUREG-1092, Environmental Assessment for 10 CFR Part 72, Licensing Requirements for the Independent Storage of Spent Fuel and High-Level Radioactive Waste at II-7 (1984). In discussing the impacts of monitored retrievable storage, the Commission found that:

> The principle [sic] operations to take place in the MRS are to provide spent nuclear fuel and HLW handling, transfer, and storage. Installations would have to be designed to ensure confinement of radioactive materials as well as provide for monitoring HLW and spent fuel storage containers. An MRS will have to be designed to permit spent nuclear fuel and high-level wastes to be retrieved and shipped to reprocessing facilities or geologic repositories. Verification of material integrity during the design lifetime of the MRS is necessary to ensure structural integrity of HLW and spent fuel storage containers for the protection of the public from releases of radioactive material into the environment.

Id. at II-3 (*emphasis added).*

The EA's Finding of No Significant Impact was based in part on "[k]nowledge of material degradation mechanisms under dry storage conditions and the ability to institute repairs in a reasonable manner without endangering the health of the public." Id. At III-2. *See also* Final Rule, Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste, 53 Fed. Reg. 31,651, 31,658 (August 19, 1988).

The DOE concurred, in DOE/RW-0402, Monitored Retrievable Storage System Requirements Document, Revision 1 (1994). DOE states that:

> The MRS facility should have the capability to provide for inspection and verification of the description and characteristics of the SNF or the content of the

loaded MPCs received. If the SNF or loaded MPC is improperly described, Waste Acceptance will be notified for resolution of the waste description.

Id. at 56. DOE also requires that: "[t]he MRS facility shall have the capability to open, remove SNF, load SNF, and seal the MPC, without damaging the SNF." Id. at 61.

PFS's failure to provide a hot cell or other facility for the inspection and repair of the contents of spent fuel canisters and the spent fuel canisters themselves violates the NRC's regulatory requirement that safety components must be capable of inspection, testing and maintenance. As one of the key barriers to the escape of radioactivity from the casks, the cladding inside the cask, and the canister which holds it, constitute vital safety components which must be subject to inspection and maintenance.

2. Hot cell needed to protect against undue risk. By failing to include a hot cell in the design for the proposed ISFSI, PFS poses undue risk to public health and safety. PFS's failure to include a design for a hot cell appears to be based on three assumptions, none of which is valid.

a. Verification of fuel condition. First, PFS assumes that the fuel shipped to it will be in good condition. This assumption is unreasonable, on several grounds. First, as discussed in Contention G regarding Quality Assurance, the Applicant will have no control over the packing of canisters and transportation casks at nuclear power plants. This operation will be performed by employees of the nuclear power plant licensees. Important

safety operations such as the welding of cask and canister covers will not be under the control of PFS, and may be carried out without proper controls or inspections.

Moreover, the potential for errors in packing methods is multiplied by the fact that the fuel will be shipped by eight or more separate nuclear power plant licensees around the country, comprising at least 19 power reactors. This is compounded by the fact that SNC, the manufacturer of the TranStor cask, has had serious problems with the quality of its materials. *See* NRC Demand for Information, EA No. 97-441 (October 6, 1997), ACN # 9710100120.

Second, the process of preparing casks at a nuclear plant for shipment to an ISFSI involves numerous complex steps that present the potential for error. The lid must be seal welded, the canister evacuated and filled with helium and the vent and drain ports welded shut. Leak testing must also be performed. Accidents or near-accidents in the recent past demonstrate that the packing of transportation and/or storage casks is subject to human error, and that it is essential to provide some means for inspecting and repairing the damaged fuel and canister. For instance, in 1994, NRC inspectors discovered that irradiated fuel had been loaded into a defective cask at the Palisades nuclear plant. NRC Inspection Report No. 71-1007/92-01 (May 6, 1992). The defect in the cask was not noticed by the licensee when the fuel was packed into the cask. The faulty welds were only discovered when NRC inspectors reviewed operations at the cask manufacturers after the time the cask had been loaded. That cask has still not been unloaded despite the fact that unloading procedures were to have been in place and are part of the Certificate of Compliance.

Another example of cask loading problems occurred at Duke Power in 1981. An NLI-1/2 cask, holding one PWR fuel assembly, was to have been shipped dry, but a worker incorrectly filled the cask with water. Letter from William Parker, Duke Power, to John Davis, NRC (December 1, 1981), ACN # 8112140019. The technician mixed up drain and vent ports while attempting to fill the cask with helium. Id. Fortunately no highway accident involving a fire occurred in the shipment. This error is also possible with the TranStor cask, because the drain and vent ports look alike.

Another example of defective fuel loading occurred in 1980, when the fuel inside an NLI-1/2 truck shipping cask self-heated, causing the uranium fuel pellets to oxidize into a fine powder.[16] The fuel was too hot to be transported within the shipping cask. The error occurred due to the use of an outdated heat generation formula. Even under routine conditions, the spent fuel temperature is quite high in the canister/basket. As past experience has shown, if helium is not present in the cask, any air near the fuel could oxidize the fuel pellets in leaking rods.

Finally, accidents may occur at the PFS facility. The transfer cask can be dropped, or the canister can be too rapidly pulled into the transfer cask. No stresses are likely to open the welds, as the TSAR's show. *See, e.g.*, TranStor TSAR at 8.1-13. But it is quite possible to warp the canister with a drop, or otherwise damage the canister so that it no longer fits within a storage or transport cask. In this case, PFS has no means for inspecting

[16] "Airborne contamination Released During Unloading of a Failed PWR Spent Fuel Assembly," PATRAM 80, p. 646.

or repairing a damaged canister, or of transferring its contents to another canister. The only effective means of performing these operations is to use a spent fuel pool or hot cell.

The only feasible way to verify the condition of the contents of the casks, including cladding degradation, is through the use of a spent fuel pool or hot cell.

b. Detection and control of contamination. PFS's second invalid assumption is that it is capable of detecting unacceptable levels of contamination. According to PFS, "[i]n the event contamination above acceptance levels is discovered, the canister will be shipped back to the originating nuclear power plant for canister decontamination and/or spent fuel repackaging." SAR at 10.2-14. PFS states that it will take smear samples in accessible regions of the casks (although there is nothing in the Tech Specs which commits PFS to do this). Id. The accessible regions consist of the canister cover, which is shielded. However, without a hot cell, it is impossible to take smear samples of the other parts of the canister which may be contaminated, because they are too radioactive for workers to approach. These other parts of the canisters may be contaminated in the spent fuel pool at the reactor, during the initial packaging of spent fuel. Moreover, even assuming the canister is "clean," it is likely vibrations on the rail or highway will shake loose radioactive contamination from metal pores, That is, even if the canister is clean when leaving the reactor, the levels of smearable contamination could rise after transit. This has happened often and is called, "weeping."

If the contamination is allowed to remain on the canisters, it may be shaken loose during transportation and transfer, and contaminate workers and the site of the ISFSI.

However, PFS has no effective means of determining whether the canisters are contaminated, or removing the contamination.

The principle, "Start clean. Stay clean," should really be "Start clean. Get Dirty." PFS argues (SAR at 7.2-11) that if smearable contamination exceeds regulatory limits, the cask will be returned to the utility. It would be highly improper to send a cask with smearable contamination above regulatory limits back on the rails and highway. Rather, a hot cell is needed to decontaminate the canister.

c. Returning defective casks is unsafe. PFS's third invalid assumption is that if casks are found to be degraded or contaminated, they can be safely shipped back to the originating licensee. SAR at 7.2-11. Putting degraded or contaminated spent fuel containers back on the road should be the **last** option considered, not the licensee's official protocol. The risk of accidents during return transportation and handling may be significantly increased if the condition of fuel is degraded or the casks contaminated. Moreover, even if transportation and handling are incident-free, vibrations during transportation may shake loose any contamination on the canisters, thus posing a risk to workers handling the returned casks.

Accordingly, the license application fails to comply with NRC regulations or provide adequate to public health and safety because it does not provide for a hot cell for inspection and handling of spent fuel canisters.

K. Inadequate consideration of credible accidents.

CONTENTION: The Applicant has inadequately considered credible accidents caused by external events and facilities affecting the ISFSI, intermodal transfer site, and transportation corridor along Skull Valley Road, including the cumulative effects of the nearby hazardous waste and military testing facilities in the vicinity.[17]

BASIS: The Applicant is required to identify, examine, and evaluate the frequency and severity of external natural and man-induced events that could affect the safe operation of the proposed facility design, as well as the past and present man-made facilities and activities that may endanger the proposed facility, as required by 10 CFR §§ 72.90 and 72.94; *see also*, §§ 72.98, 72.100, 72.108, and 72.122. While the Applicant mentioned land uses within a five mile radius of the proposed ISFSI (ER § 2.2.2, and SAR §§ 2.1.4 and 2.2), it failed to adequately address the provisions of NUREG-1567, which states:

> The locations of nearby nuclear, industrial, transportation, and military installations should be indicated on a map which clearly shows their distance and relationship to the ISFSI. All facilities within an 8-km (5-mi) radius should be included, as well as facilities at greater distances, as appropriate to their significance. For each facility, a description of the products or materials produced, stored or transported should be provided, along with a discussion of potential hazards to the ISFSI from activities or materials at the facilities.

NUREG-1567, Standard Review Plan for Spent Fuel Dry Storage Facilities (Draft), § 2.4.2, U.S. NRC, October 1996 (*emphasis added*).

[17] This contention is supported by the Declaration of Marvin Resnikoff, attached hereto as Exhibit 2.

Skull Valley is surrounded by industrial and military facilities incompatible with the proposed ISFSI and potentially a source of incidents, including a catastrophic accident, threatening the facility, the Applicant's intermodal transfer facility, and the transportation corridor along Skull Valley Road. The application's land use discussion generally refers to these nearby facilities but the Applicant has failed to adequately analyze the potential risks posed by these activities. SAR § 2.2. The Applicant examined several of the nearby facilities in a cursory manner, and concluded that an accidental explosion of conventional Army weapons being transported along Skull Valley Road en route to or from Dugway Proving Ground was the only credible explosion event that could potentially occur. SAR at 2.2-1 to -2, and 8.2-21 to -22.

The Applicant dismissed any threat of a credible accident from the Tekoi Rocket Engine Test facility (Tekoi) just 2.5 miles from the proposed ISFSI facility. (SAR at 8.2-21). The Tekoi facility is used to static fire rocket motors, conduct hazard testing of explosives, and to store rocket motors for aging tests. Alliant Techsystems Bacchus Works, Baseline Risk Assessment for Tekoi High Hazard Test Area at 2, Global Environmental Solutions (March 1996), excerpts attached hereto as Exhibit 7. The Tekoi facility static fires Titan rocket motors with approximately 210,000 pounds of propellant and has the ability to test rocket motors up to the size used for the Space Shuttle. In addition, hazard explosive testing typically requires between 10 and 100 pounds of explosives per test. Id. The Tekoi facility also has a number of test bays to concurrently store and test a number of rocket motors and has a number of activities with varying hazard ranges that may impact the

proposed ISFSI. For example, the Applicant has failed to consider possibilities, such as the potential for a static fired rocket motor to escape from the test harness, or the impact of an explosion to reach the ISFSI facility or to impact casks or cask-hauling trucks (or railcars) traveling along the access road, including the type of damage that could result from such rocket motors.

Dugway Proving Ground (Dugway), the 806,139.61 acre U.S. military reservation located approximately eight miles southwest of the proposed ISFSI, is used for combat training using live munitions and testing of conventional weapons. Dugway also tests chemical agents, chemical agent decontaminants, personal protective equipment, smokes, illuminates, and chemical and biological defense monitoring equipment. Additionally, the National Guard and Air Force use Dugway to train with live munitions, and Air Force bombers must occasionally land at Dugway with "hanging bombs," i.e., live ordnance that fails to drop from the plane and is stuck in the bombing bay during air-to-ground combat training. *See* Affidavit of David C. Larsen, attached hereto as Exhibit 8, ¶ 8. While the Applicant calculates the probability of an aircraft impacting the proposed facility (*see* SAR at 2.2-3), there is no indication that it included data involving such emergency incidents as hanging bombs, nor is there any mention that it considered the potential for sabotage relating to air flights, although the Applicant admits the possibility of sabotage against the ISFSI itself (EP at 2-16, ¶ 8).

The Applicant does not specify the in-flight crash rate per mile used in the air crash probability calculation. The Applicant indicates it utilized methods obtained from the U.S.

Nuclear Commission's Standard Review Plan, NUREG-0800. SAR at 2.2-3. NUREG-0800 incorporates data from the Department of Energy Air Crash Risk Analysis Methodology (ACRAM). *See*, Vol. 1 Tooele Chemical Agent Disposal Facility Quantitative Risk Assessment at 5-97, U.S. Army (December 1996) (hereinafter TOCDF Risk Assessment),[1] excerpts attached hereto as Exhibit 9. ACRAM calculates the in-flight crash rate per mile for commercial and military aircraft based on actual crash data for each aircraft type. TOCDF Risk Assessment at 5-97. In addition, for general aviation and helicopters, the ACRAM study generated a computer program that accepts a site latitude and longitude as input and provides the frequency per unit per year. Id. at 5-97, -98. The ACRAM computer program represents a fit to actual crash locations for the continental United States. Id. Thus, the source and accuracy of the in-flight crash rate used is critical in determining the probability of an aircraft crash into the ISFSI site. Moreover, if the in-flight crash rate is not a worse case rate for all types of aircraft, then the Applicant should calculate the aircraft frequency per aircraft type.

The Applicant must collectively consider the probability of commercial and military aircraft crashing into the ISFSI site. The Salt Lake City International Airport may direct approximately 15% of its commercial aircraft through Rush Valley, flight pattern V257. Id. at 5-100, 102. Flight pattern V257 runs north and south on the east side of the Onaqui and Stansbury Mountains. Id. at 5-100. Because of the close proximity of flight pattern V257 to

[1] This portion of the TOCDF risk assessment discusses the site-specific aircraft crash frequency estimates based on ACRAM for TODCF, a facility located approximately 20 nautical miles from the proposed ISFSI site.

the ISFSI site, the Applicant should evaluate the probability of a commercial aircraft crash into the site.

The mid to southern portion of Skull Valley is located within restricted military air space under the Sevier B & D Memorandum of Agreement. Id. at 5-101. The Applicant has failed to take into account in its accident analysis that military aircraft from Dugway Proving Grounds or from Hill Air Force Base may occupy the restricted military air space over the proposed ISFSI site during training or security missions. Moreover, the Applicant has failed to analyze potential risks from the North or South Utah Test and Training Range (UTTR). UTTR is used by the U. S. Air Force as a training range for air-to-air and air-to-ground live munitions training, propagation testing of military ordnance, and is located just 18.3 miles from the proposed ISFSI. *See*, Exhibit 8, Larsen affidavit at ¶ 12. The Applicant has also failed to take into account that Dugway is the proposed landing site of the X-33 hydrogen-powered space plane. *See*, Vol. 1, Final Environmental Impact Statement, X-33 Advanced Technology Demonstrator Vehicle Program at 2-25, National Aeronautics and Space Administration (September 1997), excerpts attached hereto as Exhibit 10. In addition, the Applicant should consider whether military training missions have a higher in-flight crash rate per mile than a military aircraft flying a routine mission, e.g., transferring from one air base to another.

Further, the Applicant has completely failed to apply any aircraft accident scenarios to the intermodal transfer point or to the proposed cask transportation route, including along Skull Valley Road as required by 10 CFR §§ 72.90, 72.94, and 72.108, nor has the

Applicant made any mention of what airways, military or commercial, pass over these areas. For example, flight pattern J154 flies directly over the intermodal transfer facility. *See*, TOCDF Risk Assessment, Exh. 7 at 5-100. PFS provides no basis for its assertion that the casks and the facility need not be "designed to withstand the direct impact of an aircraft crash" because such an accident is not a "credible event." *See*, SAR at 2.2-3, and EP at 2-15. Given the high level of military aircraft activity in the area, and the fact that this activity includes transport of live munitions, PFS should not be granted a license unless it evaluates the risks posed by aircraft accident scenarios to the intermodal transfer facility and the casks themselves as they travel on trucks or railcars to the ISFSI.

Additionally, the Applicant has failed to identify, examine, and evaluate the potential cumulative effects of the many land uses presently existing in the proposed ISFSI region. In addition to Dugway transporting conventional munitions along Skull Valley Road, as the Applicant discusses (SAR at 2.2-2), Dugway also transports various chemical agents used for testing. *See* Exhibit 8, Larsen affidavit at ¶ 4. The Applicant should evaluate the potential impacts of an accident involving chemical agent, including an accident caused by increased heavy haul truck traffic on Skull Valley Road.

Additionally, the Applicant fails to identify, examine or evaluate the potential cumulative effects of the concurrent transport of spent fuel and other hazardous materials in the region. Hazardous munitions and other materials are routinely shipped in and out of the surrounding military facilities. In addition, the commercial facilities - the Laidlaw APTUS hazardous waste incinerator, the Envirocare low level radioactive and mixed waste

landfill, the Laidlaw Clive Hazardous Waste Facility, and Laidlaw's Grassy Mountain hazardous waste landfill - located 25-35 miles northwest of the proposed ISFSI receive thousands of tons of waste yearly. Most of these shipments pass through Rowley Junction. *See*, Exhibit 8, Larsen affidavit at ¶ 12. The Applicant's proposed activities involving movement of high level nuclear waste increase the potential for accidents associated with the transportation and handling of these other types of waste.

The Applicant has made no attempt to identify, examine and evaluate the "occurrence and severity" of "important potential man-induced events" that may affect the ISFSI design, as required by 10 CFR § 72.94, from activities involving other industrial and military facilities. The Applicant must address the impacts from accidental releases from a facility that may cause the evacuation of the ISFSI or intermodal transfer station and abandonment of spent fuel casks. In addition, the Applicant should address the impact of hazardous chemical products, hazardous waste, low level radiological waste, and industrial waste being shipped along the same rail or highway routes as spent nuclear fuel casks. The Applicant should also address the potential safety and security impacts from spent fuel or other hazardous materials remaining in rail yards while awaiting shipment to a final destination, as well as the impact of such an occurrence.

L. Geotechnical

CONTENTION: The Applicant has not demonstrated the suitability of the proposed ISFSI site because the License Application and SAR do not adequately address site and subsurface investigations necessary to determine geologic conditions, potential seismicity, ground motion, soil stability and foundation loading.[2]

BASIS:

1. Surface faulting. NRC regulations recognize that areas west of the Rocky Mountains may potentially be seismically active. 10 CFR § 72.102(b). These areas, including the proposed ISFSI site, must be evaluated by the techniques of 10 CFR Part 100, Appendix A. Specifically, Appendix A, IV(b)(2) requires the "[e]valuation of tectonic structures underlying the site, whether buried or expressed at the surface, with regard to their potential for causing surface displacement at or near the site." The purpose of the evaluation is to define capable faults which exhibit "[m]ovement at or near the ground surface at least once within the past 35,000 years or movement of a recurring nature within the past 500,000 years." 10 CFR Part 100, Appendix A, III(g)(1).

Although the Applicant concludes that there is "[n]o evidence of fault offset of the surficial soils" (SAR at 2.6-35), the SAR does not provide sufficient supporting evidence of the presence or absence of buried capable faults that have moved at least

[2] This contention is supported by the Affidavit of Barry J. Solomon and the Declaration of Lawrence A. White, attached hereto as Exhibits 11, and 1, respectively.

once within the past 35,000 years or repeatedly within the past 500,000 years. Surficial material at the site was deposited by Lake Bonneville sometime between 10,000 and 25,000 years ago; however, additional material beneath the lake deposits may range in age from 500,000 to 25,000 years old. Dorothy Sack, Quaternary Geologic Map of Skull Valley, Tooele County, Utah, Utah Geological Survey Map 150 (1993).

The Applicant conducted seismic-reflection surveys to detect subsurface geologic structure in deeper bedrock and unconsolidated material directly overlying the bedrock, and seismic-refraction surveys to detect subsurface geologic structure in shallower unconsolidated material. The Applicant detected buried faults in Paleozoic bedrock beneath the site in a seismic reflection survey (SAR Appendix 2B), but concluded that the faults "do not appear to extend into the overlying unconsolidated sediments." SAR at 2.6-36. However, based on a review of the reflector profiles, several of these faults apparently displace a significant reflector above what the Applicant interpreted as the top of the bedrock, and extend upwards into the overlying unconsolidated sediments. Irregular surfaces in layers in seismic-refraction profiles of overlying shallow sediments may support an interpretation of displacement in younger material during more recent times than the Applicant determined.

Of particular concern are faults in the western half of seismic line 2 (SAR Appendix 2B, figure 4.6) which directly underlie the proposed ISFSI area; other faults which may offset unconsolidated sediments are found in seismic line 3 crossing the proposed easement area. The faults in both areas, if capable, may produce greater

vibratory ground motion than that for which the facility is designed. Moreover, the faults beneath the storage area may also pose a threat of surface fault rupture which must be accommodated in facility siting and design.

Regardless of the evidence showing displacement within the last 35,000 years, the Nevada Bureau of Mines recently determined that 64 percent of the surface-rupturing historical earthquakes in the Basin and Range physiographic province, which includes Skull Valley, occurred on faults with no prior evidence of Holocene (within the last 10,000 years) movement. DePolo, C.M., and Slemmons, D.B., 130,000 Year vs. 10,000 Year (Holocene) Classification of "Active" Faults in the Basin and Range Province (abstract), *in* Basin and Range Province Seismic Hazards Summit Program and Abstracts: Reno, Nevada, Western States Seismic Policy Council, 1997, at 28. Many of the earthquakes were on faults that had not experienced prior large earthquakes for up to 130,000 years. The Hickman Knolls Horst block, where the Skull Valley Reservation is located, may include similar faults which may be buried. Thus, the Applicant should extend its evaluation to determine the potential for seismic activity from earthquakes on faults in the site vicinity.

2. Ground motion. The site may also be subject to ground motions greater than those anticipated by the Applicant due to spatial variations in ground motion amplitude and duration because of near surface traces of potentially capable faults (the Stansbury and Cedar Mountain faults). Sommerville, P.G., Smith, N.F., Graves, R.W., and Abrahamson, N.A., Modification of empirical strong ground motion attenuation

relations to include the amplitude and duration effects of rupture directivity, *in* 68 Seismological Research Letters (No. 1) 199 (1997). Failure to adequately assess ground motion places undue risk on the public and the environment and fails to comply with 10 CFR § 72.102(c).

3. Characterization of subsurface soils. Perhaps the most significant shortcoming in the license application and SAR is the lack of any rigorous and detailed investigation of subsurface conditions that would be appropriate for any nuclear facility. The level of investigations presented is more typical of very preliminary studies for site screening efforts and not a detailed determination of site suitability for establishing design parameters.

a. Subsurface investigations. The location plans for completed subsurface investigations, cross-sections, and profiles showing subsurface soil and rock layering at the site contained in the license application is deficient in that these data could not be compared with the Applicant's boring logs. Structure specific cross sections and profiles were not prepared utilizing the boring log records. Only a generalization of the boring logs were used to establish the site geologic characterization. It is not possible to ascertain whether or not all the data collected, particularly data on zones of soft/loose conditions encountered in the explorations, have been used to characterize subsurface conditions and to establish design values and that the uncertainties normally associated with the estimation of the thickness and extent of

various materials occurring at the site have been conservatively considered in developing the soil and rock layering.

Additionally, SAR section 2.6 defining geologic features is not acceptable because the discussions, geologic maps, profiles of the site stratigraphy, structural geology, geologic history, and engineering geology are not complete and are not supported by investigations sufficiently detailed to obtain an unambiguous representation of the site geology. The maps do not provide the requisite detail to evaluate the assumed geologic conditions stated in the text. For example, only 25 borings were taken across the site, and from this a single generalized geologic profile in an obtuse angle across the canister fuel storage facility is presented. SAR figure 2.6-5. The geologic profile cannot be correlated with surface topography, geologic deposition soil characteristics, or seismic profiling completed for the site. Details missing include the interrelationship of the subsurface conditions with geologic history of the site.

Further, the application does not discuss the geochemical effects of the environment (weather and rain water) on the physical and strength characteristics of the soil and rock at the ISFSI site, particularly if there is potential for geochemical weathering and leaching of soils and rocks at the storage site. Correlations should be made with previous groundwater conditions which led to the calcareous deposition and probable cementation of the subsoils.

b. Sampling and analysis. Site specific investigations and laboratory analyses must show that soil conditions are adequate for the proposed foundation

loading. 10 CFR 72.102(d). However, PFS's sampling program is not adequate in quantity (number of samples) and quality (suitable recovery of disturbed and undisturbed samples)[3] to ensure that all materials that are critical for geotechnical evaluation of the site have been adequately sampled. For example, only five undisturbed samples were collected, and only five consolidation tests with accompanying physical properties analyses, and two unconsolidated undrained strength tests were made. Unless subsurface conditions are predictably uniform across the site, the number of tests and analyses are inadequate to accurately model the expected behavior of the soil foundation under static and dynamic loading. The prediction of soil foundation performance cannot be predicted adequately with limited data.

The investigations (sampling and analysis) to determine the properties of various materials underlying the site are not sufficient. The scope of investigations should match the design requirements of the facility and complexities of the site. For example, the analysis of soil is not based on the results of dynamic testing of insitu samples either in a stress or strain controlled manner. These data are essential in order to correlate with the field seismic profiling (shear wave determination) for use in the analysis of the seismic

[3] Soil samples from each predominant soil type within the site stratigraphy should comply with the following criteria: they should contain no visible distortion of strata, or opening or softening of materials; specific recovery ratio (length of sample recovered divided by length of sampler extension) should exceed 95 percent; and they should be taken with a sampler with an area ratio (annular cross-sectional area of sampling tube divided by full area of the outside diameter of samples) less than 15 percent. Naval Facilities Engineering Command Soil Mechanics Volume Design Manual 7.1 at 7.1-73, Dept. of the Navy (May 1982).

response of the buildings and their contents, and to determine the potential for soil collapse.

There are insufficient soil test data presented in the application to determine that strength tests have been performed on undisturbed samples and that there are sufficient relevant test data to support the selection of design parameters. *See e.g.*, SAR App. 2A, Attach. 2, at 2 and tables immediately following. For example, the soil test data did not include samples taken from each of the soil strata, did not include each foundation of buildings or structures, did not include the PMF diversion dike foundation, and did not evaluate compacted soils. There is also insufficient data to conclude whether or not soil and rock characteristics derived from the investigations have been completely and conservatively interpreted to develop design parameters. If site building foundations and soil structures have not been investigated and laboratory tests to measure and quantify the soil performance not documented, a decision regarding suitability or applicability cannot be made.

The collected field data must be compared with the soil information found in the literature, and correlated with other data for similar soils when comparing the shear modulus values. The Applicant must obtain representative undisturbed samples of each of the site soils and determine their dynamic properties. The apparent differences in Poisson's ratio as cited in SWECO calculations should be evaluated, not assumed to be an appropriate value, and then used for safety related calculations. *See e.g.*, PFS calculation package, Vol. I, Subdivision 7 at 17A and B (calculation number 01-1).

The license application does not provide a detailed and quantitative discussion of the criteria used to determine if samples were taken in accordance with acceptable test methods and tested in sufficient number to define all the soil and rock parameters needed for characterizing the site and borrow areas in accordance with the general guidance of ASTM Standards. The basis for the selection of samples and the type of test to be made is a function of the structure, anticipated loading, duration of loading (seismic) and the need to modify the soil's physical characteristics. The boring location plan appears to be merely a grid across the site and not structure specific. *See*, SAR, figure 2.6-2.

The descriptions of the test results for field and laboratory tests are generally insufficient to allow detailed analysis. While the conditions of the testing were explained to be in accordance with accepted testing procedure, any deviations from the normal procedure recommended in the standard test should be documented. For example, throughout calculation number 04-3, the criteria for the assignment of unit weight of soil, typically used in most all soil analysis (strength, consolidation, and dynamic response) are assumed values without justification of the effects of percent clay or calcareous materials. *See* PFS calculation package Vol. II, Subdivision 10 (calculation number 04-3). The justification of the values should be provided before their use is permitted in static and dynamic analysis, particularly when determining the dynamic strain response of soils under triaxial testing. Calculation number 04-3 involving bearing capacity reports the foundation soil to consist of compacted structural fill with a unit

weight of 125 pounds per cubic foot, while laboratory data calculation 05996.01-G(B)-01 in the Geomatrix (1997B) For Bases For Dynamic Soil Properties (*referred to in* PFS calculation package Vol.II Subdivision 11 at 4 (calculation number 05)), reports a value almost 50% lower (unit weight of 80 pounds per cubic foot).

A major failing in the application is the lack of a detailed discussion of field and laboratory sample preparation for testing, the omission of which prevents independent review and assessment of the quality of data collected. How samples are prepared and tests performed can significantly impact test results and their interpretation, potentially making the test results and interpretations meaningless. Additionally, the tests results may not reflect those conditions to be modeled in the field and therefore either underestimate or overestimate the response of the foundation system to actual field loading conditions. For strength tests conducted in the laboratory, full details must be given; for example, how saturation of the sample was determined and maintained during testing and how the pore pressures changed. For sites that are underlaid by cohesionless soils and sensitive clays that are or may become saturated, particularly at depths greater than 30 feet, the Applicant should show that all zones that could become unstable because of liquefaction or strain-softening phenomena have been sampled and tested to evaluate their ground-failure potential. The Applicant must also show that the static and dynamic engineering properties of the soils, such as unconfined compressive strength, shear strength parameters for strength parameters from cyclic triaxial tests, were properly determined and that reasonable and conservative values were used in the design. This

demonstration should explain how the developed data were used in design analyses, how the test data were enveloped for design, and why the design envelope is conservative. A table indicating the values of the parameter used in design should be provided and should be supported by field and laboratory test records.

c. Physical property testing for engineering analysis. The static and dynamic properties of materials needed for geotechnical analyses and design should be determined by performing appropriate laboratory and field tests which are conservative and accepted in practice by the geotechnical engineering profession. This is especially a complex site from the standpoint of assessing potential earthquakes and resulting ground motion that may affect plant operation. However, it is not possible to ascertain if the Applicant's field and laboratory test data have been conservatively interpreted to determine the design parameters recommended for the various materials at the site. The SAR relies heavily on the published values for static and dynamic strength and the performance of compacted materials, not the physical characteristics of specific site soils. PFS calculation package, Vol. I, Subdivision 7 at 35 (calculation number 01-1). Because of the limited number of tests and generalizations made with respect to the soil profile and use of general uncorroborated published soil data, a reasonable judgment cannot be made regarding the applicability of the averaging conditions as assumptions used in the design calculations. There is too much uncertainty regarding the applicability of published data to the site. For example, The dynamic analyses presented instead use

published information from 1970[4] which is extrapolated to the site without any basis for such extrapolation. The variation of shear modulus determined from testing cited in this reference is based upon a very small strain derived for laboratory compacted loose to medium dense sand materials. This data is not applicable for characterizing dynamic properties of slightly cemented silts found at the site based on SW-AJA (1972) at 39 of SWECO calculation. Please note the variation in shear modulus is reported on the graph "Range for Sands" while the recommended range of values defined by the curve for use for layer 1 curve is for silts, clays, and clayey silt. The Applicant should explain why the data extrapolated from this curve is appropriate considering the various shear strain levels. In addition, strain controlled dynamic triaxial tests should be conducted to reference one or more strain intervals to support the basis of the curves. *See e.g.*, PFS calculation package, Vol. II Subdivision 9 at 33 (calculation number 03-1).

Also some of the data do not fit together, and it appears data presented from different sources have been combined without assessing their applicability to the site. For example, the void ratio for soils indicate very loose soil conditions yet blow counts from standard penetration test are indicative of dense soils. The void ratio equation which represents the volume of soil voids divided by the volume of solids in the soil is in excess of two. *See* laboratory data results, PFS calculation package, Vol. II Subdivision

[4] Seed and Idress (1970) is referred to in the PFS Calculation Package, Vol. 1, Subdivision 1 at 41 (calculation 05996.01-G(P05)-1 entitled "Development of soil and foundation parameters in support of dynamic soil structure interaction analysis" (Rev O, 3/13/97)).

11 at 4 (calculation number 05). This soil structure may be typical of cemented sands, but no data are available to confirm that this is the case. Consolidation tests indicate the value e_0 varies between 1.615 and 2.285. Id.

$$\text{The equation } e_0 = \frac{\text{Volume Voids}}{\text{Volume Solids}} = 2 +$$

based on these consolidation test values indicates that the volume of voids in the soil is more than twice the volume of the solid materials in the soil. The Applicant should verify if this abnormally high void ratio is typical of cemented soils.

Further, the Applicant performed only limited soil engineering tests (*see*, SAR App. 2A, Attachment 2), omitting a number of additional widely accepted index and engineering properties tests, such as unit weights, porosity, compaction, etc., which should be performed for layer 1 and 2 soils. *See*, 4 Annual Book of ASTM Standards § 04.08 (Soil and Rock Dimension Stone), American Society for Testing and Materials Annual Publication (1997). Such additional tests will allow a reviewer to make a reasonable judgment about how the soil will perform under the anticipated static and dynamic loading of the short and long term conditions.

4. Soil stability and foundation loading. Based on its investigations, the SAR apparently did not consider the potential for the presence of collapsible soils beneath the site to be significant. Although collapsible soils have considerable strength

when dry, they are subject to hydro-compaction and settle dramatically when wetted. Thus, settlement associated with wetting may result in significant foundation damage.

Collapsible soils typically exhibit a loose, honeycomb structure associated with a low unit weight. Rollins, K.M., and Williams, Tonya, Collapsible Soil Hazard Mapping for Cedar City, Utah, *in* Proceedings of the 1991 Annual Symposium on Engineering Geology & Geotechnical Engineering, No. 27: Pocatello, Idaho State University 31-1 (1991). These characteristics are exhibited by three of the five soil samples subjected to consolidation tests by the Applicant; samples C-1/U-3C, C-1/U-3D, and C-2/U-2E. The three samples have void ratios ranging from 1.952 to 2.285, compared to void ratios of 1.615 and 1.625 in the other two samples, and unit weights ranging from 51.7 to 57.5 pounds/cubic foot (pcf), compared to unit weights of 64.7 and 64.9 pcf in the other two samples. SAR Appendix 2A.

Collapsible soils also have intergranular bonds composed of silt, clay, evaporites, or other cementing agents that separate larger grains, forming the loose structure and imparting a high dry strength. The tested samples were alkaline, suggesting a possible evaporitic cement component, and reacted immediately with a dilute solution of hydrochloric acid, probably indicating carbonate cement. SAR Appendix 2A, attachment 2 at 2.

When saturated, the cement in collapsible soils weakens or dissolves and the larger grains collapse into a denser, grain-to-grain soil structure. Therefore, test samples must be saturated during consolidation testing to determine their collapse potential, but

only two of the three samples, C-1/U-3D and C-2/U2E, were saturated. The Applicant states that after inundation with distilled water and the application of incremental loads over time, the test data for these two samples "appeared to indicate primary consolidation was not complete" after a considerable test interval. SAR Appendix 2A, attachment 2 at 2.

The low unit weight, high void ratios, alkalinity, reactivity with hydrochloric acid, and incomplete consolidation after a substantial test interval indicate a significant potential for the presence of collapsible soils beneath the site. The Applicant's data do not support its conclusion that "there is no potential for . . . collapse . . . or excessive settlement" of foundation soils. SAR at 2.7-2.

The SAR also concludes "there is no evidence of soluble mineral deposits in unconsolidated materials beneath the site to at least a depth of 100 feet." SAR at 2.6-37; ER at 2.6-19. However, the Applicant presents data that show evidence of alkaline shallow soil samples that reacted immediately with a dilute solution of hydrochloric acid. SAR Appendix 2A, attachment 2 at 2. These data argue for the presence of soluble minerals (evaporites and carbonates) in shallow unconsolidated materials.

Outcrops of white marl, a calcareous, laminated, open-water deposit of Lake Bonneville, were mapped throughout Skull Valley. Dorothy Sack, Quaternary Geologic Map of Skull Valley, Tooele County, Utah, Utah Geological Survey Map 150 (1993). The white marl is typically exposed in ephemeral stream cuts, underlying lake deposits similar to those at the surface of the site. Surficial samples of the marl analyzed by Sack have

calcium-carbonate contents ranging from 23.2 to 52.5 percent and are texturally similar (silt) to unconsolidated materials encountered in boreholes drilled by the Applicant. Id. Thus, the Applicant did not consider the presence of such soluble minerals during the evaluation of adequate soil conditions for the proposed foundation loading as required under 10 CFR § 72.102(d).

M. Probable Maximum Flood

CONTENTION: The application fails to accurately estimate the Probable Maximum Flood (PMF) as required by 10 CFR § 72.98, and subsequently, design structures important to safety are inadequate to address the PMF; thus, the application fails to satisfy 10 CFR § 72.24(d)(2).

BASIS: The Applicant inaccurately determined a drainage area of 26 square miles in its estimate of PMF. ER at 2.5.1, and SAR at 2.4.1.2. The facility is proposed to be located in Section 6, Township 5 South, Range 8 West. The topography of Section 6 is fairly flat from east to west with a large drainage area of over 240 square miles, producing runoff that will cross the depression in the northeast part of the section. The Applicant's 26 square mile estimate is inaccurate because the Applicant failed to account for all the drainage sources that will impact the ISFSI site during extraordinary storm events. 10 CFR § 72.98(a)-(c). *See* Affidavit of David B. Cole, attached herein as Exhibit 12. For example, the Applicant's drainage area does not take into account high canyons south of and including Deadman Canyon on the western slope of the Stansbury Mountains that produce significant runoff in wet years. Id. at ¶ 6. Consequently, the Applicant's figures for the 100-year flood and the PMF are undervalued by at least half.

Failure to adequately estimate the PMF results in the diversion berm being under-designed and does not comply with 10 CFR § 72.24(d)(2). Due to this inaccurate assessment, the need to implement emergency plans may be underestimated. The Applicant's assertion that the facility area is "flood dry" (*see* ER at 2.5-6) may not hold true

when calculations are recomputed to include the larger, more realistic drainage area. Moreover, a facility not accurately protected from flooding will impact the operation, maintenance and ultimate safety of the ISFSI. Furthermore, there is no justification to show that flood water will not curl around the berm, which will only be placed at the south end and portions of the southwest end of the ISFSI.

A number of consequences important to safety may occur because of flooding or an inadequate berm construction and location. The access road may be flooded or washed out, preventing necessary operations personnel or emergency service providers access to the site. Hence the Applicant would not be able to cope with emergencies as required by 10 CFR § 72.24(k). If the flooding is not prevented, translation motion of the storage pad and building foundations could occur, resulting in structural damage or failure. Therefore, the Applicant would not meet the requirement of 10 CFR § 72.24(d)(2) that structures, systems and components provide for the prevention and mitigation of accidents caused by natural phenomena. Flooding of the ISFSI would also transport onsite chemical and radiological contaminants to offsite soils and ground and surface waters, thus violating 10 CFR § 72.24(l).

N. Flooding

CONTENTION: Contrary to the requirements of 10 CFR § 72.92, the Applicant has completely failed to collect and evaluate records relating to flooding in the area of the intermodal transfer site, which is located less than three miles from the Great Salt Lake shoreline.

BASIS: Most spent fuel will be shipped to Rowley Junction on rail lines paralleling the Great Salt Lake. This is an area that has been impacted by extensive flooding events in the recent past due to the rise in elevation of the lake. The elevation of rail tracks in the Rowley Junction area is just three to eight feet higher than the Great Salt Lake's historic high, 4211.85 feet, which occurred in 1986 following several wetter than average years. During this extensive flooding, rail tracks located on a causeway in the lake were lost, and on several occasions, the tracks along the southern shore of the lake were threatened with inundation. Further, the elevation at the intermodal transfer site is only seven feet higher than the lake's historic high. In very wet years, these critical areas may be vulnerable to the potential of flooding, or swamping by water waves generated by wind. *See* Exhibit 12, Cole affidavit at ¶¶ 8 and 9.

By failing to identify, document, and evaluate the significance of potential flooding events to the design of the intermodal transfer site and rail route paralleling the Great Salt Lake, PFS does not satisfy the requirements of 10 CFR § 72.92. Further, the Applicant has failed to investigate information regarding floods and water waves along the lake shore that

may have been generated by earthquake or landslide events, as required by 10 CFR Part 100, Appendix A, IV(c)(2), and 10 CFR § 72.92 and § 72.102(b).

O. Hydrology

CONTENTION: The Applicant has failed to adequately assess the health safety and environmental effects from the construction, operation, and decommissioning of the ISFSI and the potential impacts of transportation of spent fuel on groundwater, as required by 10 CFR §§ 72,24(d), 72.100(b) and 72.108.

BASIS: The Applicant must evaluate its proposed site for regional environmental effects resulting from the construction, operation and decommissioning of the ISFSI and also with respect to the potential impact on the environment form the transportation of spent fuel. 10 CFR §§ 72.100(b) and 72.108. The Applicant must also assess the impact on public health and safety resulting from the operation of the ISFSI. Id. § 72.24(d).

1. Pathways and Contaminants

The facility as designed, the intermodal transfer point, and transportation of spent fuel present the potential for a number of contaminant sources. Thus, in order to satisfy § 72.100(b), the Applicant must identify the actual contaminant sources, the potential for surface and groundwater contamination, and the impact of any contamination on downgradient resources.

The SAR is required to describe "the ability of the surface and ground water environment to disperse dilute or concentrate normal and inadvertent releases of radioactive effluents for the full range of anticipated operating conditions" and to identify contaminant pathways. NUREG 1567, Standard Review Plan for Spent Fuel Dry Storage Facilities (hereafter "NUREG 1567"), p.2-10 Furthermore, the Applicant is required to review "the

transport characteristic of aquifers which are subject to radionuclide contamination, and an adequate description of the contaminant pathways" and ensure that "potential future groundwater uses are conservatively estimated." Id. p. 2-19.

The Applicant has failed to identify all effluent sources and potential contaminants and contaminant pathways that may have subsequent impacts to surface water and groundwater in the following respects:

a. Sewer/Wastewater

The Applicant expects to meet sanitation needs for the facility with an underground sewage (septic) system with leach field. ER at 3.3-4, 5 and SAR 4.3-3. However, the Applicant does not describe the facility wastewater system. In addition to the sanitation system providing a direct pathway to groundwater for chemical, heavy metal, and radiological contaminants that are collected or accidentally drained into the sewage system, it will also be a pathway for contaminants from employee hand washing, laundry, restrooms, showers, cafeteria, and laboratory waste streams. Furthermore, drain sumps used to catch and collect water which drips from shipping casks in the canister transfer building will be discharged into the sanitary system. SAR at 7.5-4.

b. Retention Pond

The Applicant proposes to collect and drain storm-water to a retention pond at the north edge of the restricted area. ER at 4.2-4. The retention pond is "free-draining" and water collected in the pond will dissipate by evaporation and percolation into the subsoil. Id. Judging from this description, the pond will be unlined. Under routine operations and

from effluent run-off, including rain water and snow melt, the storage pads will likely transport various radiological, heavy metal, and chemical contaminants to the unlined retention pond which will act as a direct pathway to groundwater. Furthermore, during heavy rains or flood events the retention pond may overflow and contaminate perennial and intermittent surface streams.

c. Operations

The Applicant's proposed operations will generate a number of radiological, chemical, or heavy metal contaminate sources that may be transferred to the groundwater. Routine maintenance of diesel generators, facility vehicles, and equipment, such as the tractor, overhead cranes, will generate various solvents and other organic contaminants. Washing or rinsing heavy haul trucks and other vehicles will generate an effluent that may be contaminated with radioactive, heavy metal, or organic contaminants both on site and at Rowley Junction. Precipitation may wash off contaminants from vehicles or cask surfaces. Laboratory operations may generate a variety of radiological, heavy metal, or chemical contaminants.

d. Construction

Construction of the ISFSI, and the access road, and widening Skull Valley Road or building a rail spur will generate a number of radiological, chemical, or heavy metal contaminate sources from the heavy machinery, vehicles, construction materials and chemicals, including fuel, solvents, asphalt, etc. that will be used during construction. These activities presents the potential for these contaminants to be released to groundwater and

surface water via drainage ditches, culverts and through seepage. For example, culverts will be located through the access road embankment "to carry the occasional runoff" and the Applicant's access road off Skull Valley Road. ER at 4.1-10.

2. Groundwater and Surface Water

The Applicant maintains that "[d]iscussion of potential contamination of groundwater is not applicable since the depth to groundwater at the site is substantially removed from any activity at the site finished grade." SAR at 2.5-5. To support its statement, the Applicant generically describes the strata at the site, the depth to groundwater at approximately 100 to 127 feet, and the low general permeability and groundwater velocity. However, the Applicant does not support its statements with any calculations based on specific factors, or the identification of the potential contaminants or direct pathways to groundwater. Moreover the Applicant has not assessed the potential for groundwater contamination at the intermodal transfer point at Rowley Junction or along the transportation route.

The Applicant estimates the groundwater depth at the ISFSI site at about 120 to 127 feet. ER 2.5-11. The Applicant then assumes groundwater along the proposed rail spur is also at a depth of over 100 feet and that "it is unlikely that the railroad spur will have any impact on hydrological resources." ER at 4.4-4. However, groundwater depths range from less than 10 feet to over 30 feet at various points along Skull Valley Road, the proposed location for the rail spur or expansion of Skull Valley Road. *See* Exhibit 13, Map: Shallow Groundwater and Related Hazards. In addition, the intermodal transfer point (Rowley

Junction) is adjacent to a protected wetland area where groundwater is encountered at less than 10 feet. Id. Furthermore, while the Applicant describes the subterranean strata, the low permeability, and the low groundwater velocity at the site, ER § 2.5.5, the Applicant does not discuss these factors along the transportation route or the at intermodal transfer point.

The Applicant has failed to adequately identify surface waters that may be effected if NRC issues a Part 72 license. The Applicant generically states that there are "few perennial streams in Skull Valley and none in the vicinity of the [ISFSI;]" some dry washes that drain northward or northwestward in the vicinity of the ISFSI; and that no springs occur within 5 miles of the ISFSI but some spring channels are located near Timpie and Delle. ER at 2.5-2, 4.1-10. In addition, the Applicant mentions that "[s]prings also occur at several locations along Skull Valley Road, surfacing at various distances from the highway ... [and] no perennial lakes or ponds are within 5 miles of the [ISFSI] other than a few stock ponds or small reservoirs built for irrigation purposes." ER at 4.3-6. This discussion is inadequate to permit an assessment of surface waters that may be affected by construction, operation, and decommissioning of the site and transportation of spent fuel. For example, there are at least fifty springs located within 15 miles of the proposed ISFSI. Exhibit 14, Springs Within the Skull Valley Watershed. Furthermore, there are perennial waters protected for agricultural uses located within 10 miles of the site. Id.

The Applicant states that earthen berms which serve to divert flooding will "have little effect on the natural surface hydrology." ER at 4.2-5. However, the Applicant fails to

justify its conclusion that a concentration of flood water around the facility will not impact surface water or groundwater. *See* Contention M (Probable Maximum Flood) whose basis is adopted herein by reference.

3. Water Usage

The Applicant has failed to adequately discuss or evaluate the effect of its water usage on other well users and on the aquifer.

The Applicant estimates its water needs at 1,500 gallons per day. ER 4.2-4. However, the Applicant does not specify if the estimate is a daily average or a peak usage estimate. The Applicant also does not indicate if the 1,500 gallons per day is the estimate during construction, construction/operation, or decommissioning. Furthermore, the Applicant implies that it plans to draw water from onsite wells. Id.

In addition to the requirements of 10 CFR §§ 72.24(d), 72.011(b) and 72.108, for a site located over an aquifer which is a source of well water, NUREG 1567, p. 2-10, requires the Applicant to survey groundwater users and well locations, static water levels, well pumping rates and aquifer drawdown. Also required in the SAR is a discussion of the future projected amount of water withdrawals. Id. p. 2-13.

Well water is used as a source of potable water by users near the vicinity of the proposed ISFSI site. For example, the Petitioners, Castle Rock, et al, in their petition to intervene, p. 4, state that they owns nine separate homes located in Skull Valley north of the ISFSI along Skull Valley Road and each home is provided with culinary water through wells located adjacent to the homes. Also the affidavits attached to Ohngo Gaudadeh Deva

(OGD) Petition to Intervene state that the affiants rely on well water for their culinary needs. *See* Affidavits of Lester Wash ¶ 7, Garth Bear ¶ 5, Abby Bullcreek ¶ 8; Margene Bullcreek ¶ 8 attached to OGD's Petition to Intervene. The Applicant states that "[l]ocalized drawdown of the valley aquifer will occur in the vicinity of the wells, the extent of which cannot be estimated until the wells are drilled." SAR at2.5-5. This statement is inadequate to comply with the regulations as implemented by NUREG 1567. The Applicant should provide an estimate based on an estimated pump rated and local hydrological data. Furthermore, the Applicant has failed to discuss water needs, the impact of water usage, and water rights at the intermodal transfer site.

4. Downgradient Impacts

The Applicant has failed to discuss the impact of groundwater contamination on downgradient hydrological resources. As the Applicant generally indicates (ER 2.5-8 to 10), recharge to the groundwater in Skull Valley watershed is from precipitation mainly collected from the Stansbury, Onaqui, and Cedar Mountains. Hood, J.W. and Waddell, K.M., Hydrologic Reconnaissance of Skull Valley Tooele County, Utah: Utah Department of Natural Resources Technical Publication No. 18, 1968. Groundwater generally flows from the recharge areas along both sides of the valley (base of the mountains) toward the middle axis of Skull Valley. Id.

The proposed ISFSI site and Skull Valley Road are located within the Skull Valley watershed. Groundwater at the site moves northwest, toward the axis of Skull Valley. North of the reservation, the groundwater then flows north, then northeast where it

discharges through evapotranspiration or surface flow and under flow to the Great Salt Lake. Id. at 57.

In generically discussing groundwater characteristics, the Applicant has failed to discuss the environmental effects and impact from groundwater contamination on more than thirty wells used for irrigation and stock watering located down gradient of the ISFSI. In addition, the Applicant has failed to discuss the impact on approximately fifty springs that located within 15 miles of the ISFSI. Exh. 14 Also, the Applicant has failed to discuss the impact of groundwater contamination on the downgradient Timpie Springs Waterfowl Management Area (Timpie Springs) and the Great Salt Lake. These areas provide wetlands and habitat for aquatic wildlife and shorebirds. In fact the Great Salt Lake is a western hemisphere shorebird reserve and the world's largest staging area for Wilson's Phalaropes and has seventy-five percent of the western population of Tundra swans; it also provides habitat for bald eagles (threatened species) and peregrine falcons (endangered species). *See e.g.*, ER Table 2.3.2 Timpie Springs and the Great Salt Lake, like all ground and surface water resources in the area, are critical to Utah's ecosystem. Potential accidents involving casks being transported along the rail route which parallels the Great Salt Lake and Timpie Springs into Rowley Junction would have serious effects on these areas as would contamination of ground of ground and water along the corridor route and from the ISFSI site.

P. Inadequate Control of Occupational and Public Exposure to Radiation

CONTENTION: The Applicant has not provided enough information to meet NRC requirements of controlling and limiting the occupational radiation exposures to as low as is reasonably achievable and analyzing the potential dose equivalent to an individual outside of the controlled area from accidents or natural phenomena events.

BASIS: The Applicant has not complied with the Commission's radiation protection and monitoring regulations pursuant to 10 CFR § 72.24(e) and (m); NUREG-1567, *Standard Review Plan for Spent Fuel Dry Storage Facilities (Draft*), U.S. NRC (October 1996) Section 9 (Radiation Protection Evaluation) (hereinafter NUREG-1567); NRC Reg. Guide 3.62, *Standard Format and Content for the Safety Analysis Report for Onsite Storage of Spent Fuel Storage Casks,* Section 9, (Radiation Protection); NRC Reg. Guide 8.8, *Information Relevant to Ensuring the Occupational Radiation Exposures at Nuclear Power Stations will be As Low As Reasonably Achievable*, U.S. NRC, Revision 3 (June 1978); and NRC Reg. Guide 8.10,

Operating Philosophy for Maintaining Occupational Radiation Exposures As Low as is Reasonably Achievable, U.S. NRC, Revision 1-R (May 1977), in the following respects:

1 The Applicant has not provided detailed technical information to show that the policy of minimizing exposure to workers as a result of handling the casks is adequate. Reg. Guide-3.62 § 7.1.1. If the design of the ISFSI has incorporated ALARA concepts then the casks chosen from vendors should have the lowest dose rates but PFS has failed to provide the technical information describing why the two cask vendors were chosen and a description and comparison of the dose rates with other comparable casks for the OCA boundary array. PFS has not described the design features that provide ALARA conditions during transportation, storage and transfer of the waste. 10 CFR § 72.24(e).

2. The Applicant has failed to provide an analysis of alternative procedures to indicate whether the proposed procedures for workers handling the casks will result in the lowest individual radiation and collective doses. NUREG-1567, § 9 and Reg. Guide-3.62 § 7.1.2.

3. The Applicant has not adequately described why the OCA boundary was chosen and whether boundary dose rates will be the ultimate minimum values compared to other potential boundaries. Reg. Guide-3.62 § 7.1.2, Design Considerations.

4. The Applicant has failed to indicate whether rain water or melted snow from the ISFSI storage pads will be collected and analyzed prior to disposal and whether

it will be handled as radioactive contaminated waste. Reg. Guide-3.62 § 7.1.3, Operational Considerations.

5. The Applicant does not provide design information for the ventilation systems in the unloading facility to show that contamination will be controlled and workers protected during unloading of the shipping casks, loading of the storage casks and preparation of leaking canisters for offsite shipment to be compatible with the ALARA principle. Procedures to service, test, inspect, decontaminate, measuring filter efficiency and replace components of the ventilation system are not provided. Reg. Guide-3.62, § 7.3.1. Without an adequate ventilation system airborne contamination will spread within the facility and to the outside.

6. Reg. Guide 3.62 states that the Applicant should provide "information on methods for radiation protection and on estimated radiation exposures to operating personnel during normal operation and anticipated operational occurrences (including radioactive material handling, packaging, transfer, processing, storage and disposal; maintenance, routine operational surveillance and calibration."PFS has failed to provide adequate or complete methods for radiation protection. Information on how estimated radiation exposure values to operating personnel were derived is not provided to determine whether the dose rates are adequate.

7. The Application is deficient in many other respects related to ensuring that occupational exposures to radiation are ALARA including: (1) adequately describing the management policy and organizational structure related to ensuring ALARA

exposures reflected in administrative procedures for personnel (Reg. Guide 3.62 § 7.1.1); (2) adequately describing a training program that insures all personnel working with radioactive materials, entering radiation areas or directing the activities of others who work with radioactive materials or enter radiation areas understand and can evaluate the significance of radiation doses in terms of the potential risk, including outlines of the training classes (Reg. Guide 8.8 § 1.c); (3) providing specifics on personnel and area, portable and stationary radiation monitoring instruments and personnel protective equipment including specifications that include reliability, serviceability and limitations of internal accumulations of radioactive material, and a description of the program for routine calibration and checks for equipment operation and accuracy that reflect the ALARA program (Reg. Guide 8.8 § 1.d); (4) description of a program to effectively control access to radiation areas and control over the movement of sources of radiation within the facility (Reg. Guide 8.10 § 1.b); (5) adequately describing a program to maintain ALARA exposures of personnel servicing leaking casks for offsite shipment or onsite storage; (6) an adequate description of a program for monitoring clean areas to assure that they remain clean and monitoring dose rates in radiation zones to ensure they are kept ALARA; and (7) specific information on formal audits and reviews of the radiation protection program, including reviews of operating procedures and past exposure records. Reg. Guide 8.8 § 4. The Applicant does not describe a fully developed radiation protection program and thus the safety of workers due to potential radiation exposure cannot be assured.

8. 10 CFR § 72.126(d) requires that "[a]nalyses must be made to show that releases to the general environment during normal operations and anticipated occurrences will be within the exposure limit given in § 72.104. Analyses of design basis accidents must be made to show that releases to the general environment will be within the exposure limits given in § 72.106." The Applicant has completely failed to include an analysis of accident conditions including accidents due to natural phenomena.

9. Applicant's failure to adequately control airborne effluent, *see* Contention T, whose Basis 3(a) (Air Quality) is adopted and incorporated by reference herein, may cause unacceptable exposures to workers and the public.

Q. Adequacy of ISFSI Design to Prevent Accidents

CONTENTION: The Applicant has failed to adequately identify and assess potential accidents, and, therefore, the Applicant is unable to determine the adequacy the ISFSI design to prevent accidents and mitigate the consequences of accidents as required by 10 CFR 72.24(d)(2).

BASIS:

1. The Applicant states that"the most vulnerable fuel" can withstand 63g in the most adverse orientation. SAR at 8.2-32. However, the Applicant does not provide the basis for its statement. The Applicant does not specify whether this includes fuel with leaks and cladding failures which has been stored underwater for many years and dry for many more years. Furthermore the Applicant has not provided the g loading that would cause such fuel to fail.

2. The Applicant has failed to discuss canister end accidents involving improperly constructed casks. It is unclear whether the TranStor cask is subject to the same quality of fabrication as the VSC-24. SAR at 8.2-34. The NRC issued a Demand for Information to SNC on October 7, 1997 as a result of numerous NRC inspection findings indicating that, since 1992, Sierra Nuclear's quality assurance and corrective action programs have failed to identify and correct design control and fabrication deficiencies. A canister with fabrication deficiencies could fail, and if it contained failed fuel, fission products could be released.

3. The cask maximum lift heights of 10 and 18 inches imply that vertical drops greater than these amounts would result in damage to the canister or interior contents. SAR at 10.2-9. The Applicant must not only address lifting accidents while onsite at the ISFSI, but at the intermodal transfer site or during transport on either rail or highway, where significant damage could occur during an accident with potential resulting release of nuclear material. Cladding of spent fuel elements is likely to be very brittle through extensive radiation embrittlement, so cladding failure is likely during such accidents.

R. Emergency Plan

CONTENTION: The Applicant has not provided reasonable assurance that the public health and safety will be adequately protected in the event of an emergency at the storage site, at the transfer facility, or offsite during transportation.[5]

BASIS: The Applicant has not complied with the Commission's emergency planning regulations in 10 CFR § 70.22, nor has it followed Regulatory Guide 3.67, Standard Format and Content for Emergency Plans for Fuel Cycle and Materials Facilities, U.S. Nuclear Regulatory Commission (September 1990) (hereinafter Reg. Guide 3.67); or NUREG-1567, Standard Review Plan for Spent Fuel Dry Storage Facilities *(Draft)*, U.S. Nuclear Regulatory Commission (October 1966) Appendix C (Emergency Planning) (hereinafter NUREG-1567), in the following respects:

1. The Applicant has not adequately described the facility, the activities to be conducted at the facility, and the area near the facility in sufficient detail to evaluate the adequacy and appropriateness of the Emergency Plan. Reg. Guide 3.67 § C.1 provides applicable guidance to the Applicant for incorporating in the EP a description of "the type, form and quantities of radioactive and other hazardous materials," including a "list of all hazardous chemicals used at the site, typical quantities possessed, locations of use and storage, and the hazardous characteristics;" an adequate description of the "primary routes for access of emergency equipment" which should include a description of an alternate

[5] This contention is supported by the Declaration of Lawrence A. White, attached hereto as Exhibit 1.

route for use in adverse weather conditions; a "description of potential impediments to traffic flow;" a description of "the types of terrain and the land use patterns around the site;" and an adequate description of the intermodal transfer station and the liquid retention pond, including the "hazardous characteristics" of the storage pad runoff pond. The Applicant has merely touched on some of these requirements without adequately addressing any of them, and in fact, regularly refers to its "Emergency Plan implementing procedures" which will be developed sometime in the future to take care of numerous details which should have been described in its Emergency Plan. *See e.g.*, EP at 2-7 and 5.1.

PFS has failed to describe and consider area specific impediments to emergency response such as flooding, high winds, range fires, ice and snow, and the presence of grazing domestic and wild animals on access roads which will impede the response of off-site emergency assistance and the transporting of on-site victims to off-site medical facilities.

2. The Applicant has not identified "adequate emergency and medical facilities and equipment to respond to an onsite emergency" as provided by Reg. Guide 3.67 § 4.3. The Emergency Plan (EP at 1-4) identifies Tooele County/City as the primary off-site support for major emergency support, but has not provided a description of Tooele County's capabilities and training in handling wounds and emergency conditions involving radioactive materials. The Applicant merely states that the "Tooele Valley Medical Center ....is equipped to provide decontamination and ambulance services..." but does not supply any details about Tooele Valley Medical Center's capabilities. EP at 1-4. Notably, in

commenting on PFS's Emergency Plan, Kari Sagers, Tooele County's Emergency Management Director, pointed out: "Some of the items I find conspicuously absent include ... [o]n-site and off-site training, monitoring, and protective equipment requirements." *See* Sagers' June 3, 1997 letter at 2, included as an attachment to the EP. The Applicant should address whether the Tooele Valley Medical Center actually has the expertise to handle radiological medical emergencies. At the very least the Applicant should "[d]escribe the measures that will be taken to ensure that offsite agencies ... have the necessary periodic training, equipment, and supplies to carry out their emergency response functions," as provided by Reg. Guide 3.67 § 4.3.[6]

Furthermore, support from Tooele Valley Medical Center and Tooele City is at least two hours away from providing any real response. *See e.g.*, Affidavit of Garth Bear ¶ 7 attached to Ohngo Gaudadeh Devia's Petition to Intervene and Request for Hearing dated September 12, 1997. The Applicant has not identified what extra preparedness the site has or will implement as a result of off-site support being so far away, especially in adverse weather conditions.

3. The Applicant has not adequately identified, notified nor coordinated with "the principal State agency and other government (local, county, State, and Federal) agencies or organizations having responsibility for radiological or other hazardous material

[6] The expertise in the State for providing radiation training would come from Utah Division of Radiation Control. However, the State has no records showing it provided training in responding to radiologic incidents to the Tooele Valley Medical Center personnel.

emergencies at the facility." Reg. Guide 3.67 § 4.4. The Applicant has not included "the local emergency planning committee established under the Emergency Planning and Community Right-to-Know Act of 1986; State departments of health, environmental protection, and emergency and disaster control" as provided by Reg. Guide 3.67 § 4.4. The plan assumes that no assistance will be required from resources external to Tooele County/City because "[t]he PFSF will not have extremely hazardous substances present in an amount equal or greater than the threshold planning quantities of 10 CFR 355." EP at 2-6 But the plan does not provide a list of hazardous materials used at the PFSF, including quantities, locations, use and storage requirements as provided by Reg. Guide 3.67 § 1.2.

The application states that "the worst case accident involving an ISFSI has insignificant consequences to the public health and safety." EP at 2-7. But the application has completely failed to address response to transportation accidents and accidents at the Applicant's transfer station at Rowley Junction. From 100 to 200 shipments of loaded spent fuel canisters will be transported through the State annually. SAR at 1.4-2. The most likely mode of transportation to the site from Rowley Junction is by heavy haul truck. The management and handling of such a large volume of material will create a high potential for accidents having significant consequences to public health and safety. The application does not address response action for accidents and fatalities occurring either in the Applicant's intermodal transfer area or in the Applicant's transportation route along Skull Valley Road, a description of how emergency information will be disseminated to these areas, nor a description of the training program to respond to these emergencies as provided by Reg.

Guide 3.67 §§ 4 and 5. For example, the Applicant merely repeats the provisions of Reg. Guide 3.67 § 7.2 regarding orientation tours for off-site emergency response personnel. EP at 6-2 to 6-3. Without identification of these fundamental components of an emergency plan, there is no assurance that PFS can or will take adequate protective actions in the event of an emergency.

4. The Applicant has not provided details to "describe the means and equipment provided for mitigating the consequences of each type of accident" as provided by Reg. Guide 3.67 § 5.3 and 10 CFR § 72.32(a)(5). For example, the means and equipment for restoring safe conditions to the site after a cask tip-over accident are not described. The Plan states that after a tip-over accident, the cask must be returned to its natural upright position within 48 hours and that PFS will procure a capable crane within the necessary timeframe. EP at 3-4. As the proposed ISFSI site is located in a rural area, the Applicant must identify with specificity the location from which a capable crane can be procured and the time in which it will take to acquire such a crane. Furthermore, the Applicant must also address its ability to locate a crane on-site within the 48 hour critical time limit during adverse weather conditions, taking into account the secondary and mountain roads that provide access to the site.

The SAR at 2.3-2 describes the climate of Skull Valley as "semi-arid continental," with precipitation ranging from 7 to 12 inches/year (SAR 2.3-12). Thus, fire is a serious risk which must be taken into account. However, the Plan states that fire fighting capability is available on-site which includes a fire truck and fire fighting equipment but does not state

whether sufficient water is available to fight a fire of any consequence and does not describe the program for maintaining any equipment. EP at 3-5. The Applicant expects to obtain water for fire fighting, as well as for potable water and for the concrete batching plant, from surface storage tanks since "it is unlikely that water wells drilled into the main valley aquifer would yield adequate quantities of water for these purposes on demand." SAR at 2.5-5. However, whether the storage tanks could hold sufficient water for a serious fire must be further examined, especially since the Applicant has identified the use of a fire truck at the site, another fire truck available from the reservation, as well as trucks supplied by Tooele County Fire Department, all of which may need access to the water tanks in a widespread difficult fire situation. *See e.g.,* Affidavit of Garth Bear ¶ 5.

5. The Emergency Plan does not contain sufficient detail to meet the provisions of Reg. Guide 3.67 § 5.4.1, because the Applicant has failed to provide adequate information on specific protective, communication, medical, contamination control, decontamination, fire fighting, radiation detection and hazardous material detection equipment with inventory lists and specific locations of the equipment. *See* EP at 5-8 to 5-9. Without specific adequate information, emergency preparedness personnel may not be capable of providing a timely response to an emergency. For example, the Plan provides no description of the locations of emergency equipment and supplies, a means for distributing these items, nor even criteria for issuance of emergency equipment, pursuant to Reg. Guide 3.67 § 5.4.1.2.

S. Decommissioning.

CONTENTION: The decommissioning plan does not contain sufficient information to provide reasonable assurance that the decontamination or decommissioning of the ISFSI at the end of its useful life will provide adequate protection to the health and safety of the public as required by 10 CFR § 72.30(a), nor does the decommissioning funding plan contain sufficient information to provide reasonable assurance that the necessary funds will be available to decommission the facility, as required by 10 CFR § 70.3(b).

BASIS: The Applicant's decommission plan and funding of the plan are deficient in the following respects:

1. The Applicant has failed to provide reasonable assurance, as required by 10 CFR § 72.30(b), that funds will be available to decommission the ISFSI. The Applicant

intends to obtain a letter of credit "in amount of $1,631,000 to cover the estimated facility and site decommissioning costs, exclusive of the storage casks." LA at 5-2. As a newly formed entity and without any documentation included in the application as to PFS's capital structure or assets, the Applicant offers no reasonable assurance that it will be qualified to obtain such a letter of credit. Contention E (Financial Qualifications), which more fully discusses the financial assurance for newly formed entities, and whose basis is incorporated by reference into this contention.

2. The financial assurance regulations for decommissioning allow for use of an external sinking fund coupled with a surety method or insurance. 10 CFR § 72.30(c). The application specifies a surety will be in the form of a letter of credit, but does not provide the wording for the letter of credit or state that the letter of credit is irrevocable. LA at 10-2, LA App B, at 5-2, SAR at 9-6. This is contrary to Regulatory Guide 3.66, Standard Format and Content of Financial Assurance Mechanisms required for decommissioning under 10 CFR Parts 30, 40, 70 and 72 (hereafter "Reg. Guide 3.66"), p. 1-4, which states that the Decommissioning Funding Plan "should include the text of the financial assurance instrument(s) that a licensee has chosen to comply with the financial assurance requirements."

3. The application states that decommissioning will be preceded by off site shipment of the canisters containing the spent fuel. LA App. B, at. 1-1, 2-3; SAR at 9.6-1. However, the Applicant's own words belie this possibility. In its discussion of "Need for the Facility" (ER 1.2), the Applicant portrays existing reactor sites as running out of spent

fuel storage options. The Applicant also states that its facility "would allow reactors that are permanently shutdown to remove all the spent fuel from the site, thus permitting the complete decommissioning of the site." ER at 1.2-2. Therefore, the shipment of the spent fuel back to the originating nuclear power plants will not be viable at the time of decommissioning of the ISFSI.

It is not unrealistic to expect that once the spent fuel casks are stored at the PFS ISFSI, they will remain there beyond the expected license term because there are no off site shipment options. Fuel shipments to Morris, Illinois and West Valley, New York, offer two excellent examples of the plausibility of a this occurrence.

The facility at Morris, Illinois, built by General Electric for reprocessing of spent fuel but never operated as such, included a wet storage pool in which spent fuel was staged for reprocessing. Although no spent fuel was reprocessed in that facility, the spent fuel has remained in storage for decades in the absence of disposal or alternative storage. Similar circumstances developed at the West Valley facility, which was originally built and operated by Nuclear Fuel Services. At that location, spent fuel was reprocessed and high-level waste was generated, and in the absence of disposal or alternative storage capacity, the high-level waste has also remained at that site for decades.

Furthermore, the federal government has not provided a disposal facility to which the spent fuel could be sent. Therefore, the major prerequisite for decommissioning (*i.e.*, a facility to which the spent fuel could be shipped so that decommissioning could begin) is simply assumed to be available. This points out another defect in the application: The

Applicant has failed to identify contingent costs in the realistic event that the ISFSI cannot be decommissioned at the end of the license term.

4. The Applicant has failed to justify the basis for all decommissioning cost estimates. The application estimates the cost to decommission a storage cask is $17,000 and estimates the decommissioning cost for the remainder of the ISFSI at $1,631,000. LA pp. 1.7, 3.2. There can be no meaningful review of these amount unless they are broken down with some specificity. Furthermore, the decommissioning cost estimates do not state the year's dollars used (*e.g.*, 1997 dollars) as provided in NUREG-1567, Draft Standard Review Plan for Spent Fuel Dry Storage Facilities. LA Appendix B, Chapter 4.

In addition, some of the estimates provided do not appear consistent. For example, the Applicant specifies that $5 per square foot is adequate to decontaminate the Canister Transfer Building, whereas the Applicant estimated cost to decontaminate the cask surface is $1 per square foot. LA, App B, pp. 4-2 & 3. The reader is unable to determine whether the Applicant erred in estimating the decommissioning costs or whether there is a reason for the discrepancy in costs.[7]

The application lacks the detailed and justified cost estimates are necessary to evaluate the adequacy of the Applicant's decommissioning costs. The Applicant tries to excuse this omission by stating that decontamination efforts are not currently capable of being quantified, LA, App. B, at2-1. This excuse is invalid. An applicant for a part 72 ISISI

[7] Adding the disposal costs of $550 per cask, which is not included in the $1 per square foot cask decontamination costs, only adds an additional $1.50 per square foot to that cost per cask. LA App. B, at 4-2. The cost per square foot to decontaminate the Transfer Building is double this cost.

license must submit a Decommissioning Funding Plan "at the time of the license application." Regulatory Guide 3.66, Standard Format and Content of Financial Assurance Mechanisms required for decommissioning under 10 CFR Parts 30, 40, 70 and 72 (hereafter "Reg. Guide 3.66"), at.1-3, 1-6. Moreover, the Decommissioning Plan must include "comprehensive consideration of both direct and all indirect decommissioning costs. The plan must compare the cost estimate with present funds, and if there is a deficit in present funding the plan must indicate the means for providing sufficient funds for completion of decommissioning." NUREG 1567, at 16-4. This information is missing from the application.

Furthermore, to ensure that sufficient decommissioning funds are available, the Applicant should take a conservative approach in estimating the following: maximum quantities of spent fuel, other radioactive waste, and solid and hazardous waste generated during the license term; size of decontamination surface areas; disposal needs for spent fuel, low level radioactive waste, solid waste, hazardous waste and other regulated materials; and demolition and removal of the structures and restoration of the site to its original state.

5. The decommissioning cost estimate totally ignores the potential for large accidents and associated release or contamination at the ISFSI. LA Appendix B, Chapter 4. The very large number of casks that are to be handled at the ISFSI and the large number of operations and movements that will be required argue strongly for anticipating this potential and making arrangements for a multimillion dollar increase in decommissioning to "provide

reasonable assurance that the planned decommissioning of the ISFSI will be carried out" as required by 10 CFR § 72.30.

6. The Applicant has failed to reasonably anticipate the extent of severity of contamination by optimistically presuming there will be no residual contamination on the casks or pads. For example, the Applicant indicates that the storage pads will not be contaminated and only includes funding to decontaminate 10% of the total surface area. LA, Appendix B. The basis for funding cleanup of only 10% of the storage pads is not justified. *See also* Contention J (Inspection and Monitoring of Safety components), Basis 2(b) (Detection and control of contamination). Therefore, the Preliminary Decommissioning Plan should provide procedures and cost estimates that reflect realistic consideration of the potential need for decommissioning of a facility that has experienced contamination from canister releases. LA App. B, at 2-1, 6-1.

7. The Applicant has failed to identify the types of waste it anticipated will be generated at the facility. Moreover, the Applicant has failed to propose decontamination and disposal practices except to state that "to the extent practicable ... conventional methods [will be used]." LA App. B, at 2-3. For instance, the Applicant assumes that the welded closure of canisters of spent fuel makes impossible or precludes leakage of canisters. As recently evidenced by the Sierra Nuclear VSC-24 cask design deficiencies, welding does not always result in a leak tight closure and demonstrated leak tight welded closures can subsequently fail. *See e.g.*, NRC Demand for Information, EA 97-441 (October 6, 1997) ACN # 9710100120.

8. The application inadequately addresses decontamination of storage casks. The Applicant makes the following statement: "Storage casks with contamination or activation levels above the applicable NRC limits for unrestricted release will be dismantled, with the activated or contaminated portions segregated and disposed of as low level waste" (*emphasis added*). LA, App. B, at 2-3. Nowhere does the Applicant discuss the process by which dismantling will occur, where dismantling will occur, and whether the Applicant will have trained personnel, suitable equipment and appropriate safety procedures to undertake this operation. This information is necessary to provide effective detail on decommissioning plans and costs.

9. The Applicant has failed to adequately estimate the cost of decontaminating each storage cask liner. The estimated cost of decontamination of a typical storage cask liner is dependent upon the percentage of the liner assumed to exhibit contamination or activation. The analysis presented includes an unsupported assumption that only 20% of the typical liner will be contaminated. A larger percentage would increase the estimated decontamination cost beyond that provided for in cask decontamination prepayments to the decommissioning funding plan. Adequate funding for storage cask decommissioning cannot be assured because it would then depend on successful assessment of participating customers to pay for the additional costs. LA App. B, at 4-2. This cost may also be increased as a result of Applicant's failure to provide a means for decontaminating all parts of the canisters. *See* Contention J, Inspection and Maintenance of Safety Components, Basis 2 (Hot cell needed to protect against undue risk).

10. The Applicant specifies that decommissioning costs include $250,000 for a survey of the ISFSI site. LA, App B, pp. 4-2, 3. However, the Applicant does not describe the type of survey or the sampling protocol. Without such information, it is impossible to determine the adequacy of the plan or the decommissioning cost estimates. The Applicant's generic description of an intent to meet NRC limits for unrestricted release fails to meet the "sufficient information on proposed practices and procedures for the decommissioning of the site and facility" required by 10 CFR § 72.30(a). Id. at 2.3.

11. The Applicant has failed to provide decommissioning procedures and costs at an intermodal transfer facility (Rowley Junction). In fact the application has failed to provide any significant details concerning the planned structures and operations at the transfer facility.

T. Inadequate Assessment of Required Permits and Other Entitlements

CONTENTION: In derogation of 10 CFR § 51.45(d), the Environmental Report does not list all Federal permits, licenses, approvals and other entitlements which must be obtained in connection with the PFS ISFSI License Application, nor does the Environmental Report describe the status of compliance with these requirements.

BASIS: NEPA requires the NRC to fully assess any other permit, license, approval or other entitlement the Applicant is required to obtain in connection with this license application and also to address applicable environmental quality standards and requirements. Because the Applicant has not addressed all of these requirements, the NRC cannot timely and adequately assess these requirements nor can the petitioners or the general public assess the scope and effect of granting the license sought by this Applicant.

1. Property Rights and Entitlements

a. Entitlement to use and control the proposed site

The Applicant has failed to show that it is entitled to use the land for the ISFSI site and if it does have such a right whether there are any legal constraints imposed on the use and control of the land.

The Applicant and the Executive Committee of the Skull Valley Band of Goshute Indians have entered into a lease for the facility site. The lease between the tribe and the Applicant must be approved by the Bureau of Indian Affairs (BIA). 25 USC § 415, 25 CFR Part 162. The BIA has waived certain regulatory requirements and

has granted "conditional" approval of the lease, subject to completion of the NRC's Environmental Impact Statement. After several Freedom of Information Act requests, the BIA eventually sent the State a copy of the lease between the tribe and the Applicant. However, the BIA redacted significant portions of the lease, including lease termination provisions, frustration of purpose provisions, surety bonding arrangements, lease rent, and taxes and regulations. Amended and Restated Business Lease between Skull Valley Band of Goshute Indians and Private Fuel Storage, L.L.C., May 20, 1997 is attached hereto as Exhibit 15.

The State is concerned that it will be left in legal limbo because BIA is deferring to the NRC process for an evaluation of the environmental effects caused by the tribe entering into the lease and NRC may defer to the BIA the evaluation of the lease provisions. However, it is incumbent on NRC to require the Applicant to fully disclose all provisions of the lease in order that the NRC and petitioners may evaluate under what conditions the Applicant is entitled to use and control the site, the financial costs associated with the lease, the termination and frustration of purpose provisions, and tribe's regulatory requirements.

b. Intermodal transfer point

Rail shipments of up to 200 casks of nuclear waste will be arriving at Rowley Junction annually. The Applicant completely ignores any discussion or proof of its legal

entitlement to build a transfer facility at Rowley Junction.[8] In addition, the Applicant has not identified the number of casks expected on each shipment or explained the effects of rail congestion at Rowley Junction. Furthermore, the Applicant has not shown that Union Pacific Railroad is capable or willing to handle the shipments coming into Rowley Junction. Finally, the Applicant has not demonstrated that it has the right to use a terminal at Rowley Junction to handle each shipment or that Rowley Junction has the capacity of handling the expected number of casks. These entitlements must be addressed as part of this licensing action.

c. Right to construct a rail spur

The Applicant has shown absolutely no ability or authority to build a rail spur from the rail head at Rowley Junction to the proposed ISFSI site. The main rail line is on the north side of interstate 80. A narrow freeway underpass allows access to Skull Valley Road on the south side of interstate 80 and from there it is 25 miles along the two-way 22 foot wide Skull Valley Road to the proposed ISFSI site. *See* copy of photographs and construction drawing of the underpass at Exh. 2 to the State's July 21, 1997 2.206 petition. PFS has the audacity to claim that it may build a rail spur in the public right-of-way parallel to Skull Valley Road. ER at 3.2-5. If PFS cannot use the public right-of-way, it must acquire the right to use land from property owners along Skull Valley Road, namely the U.S. Bureau of Land Management and Intervenors, Castle

[8] All land, except for a 100 ft. right-of-way from the middle of the main line is privately owned. *See* plat map attached as Exh. 1 to the State's July 21, 1997 2.206 petition.

Rock, et. al. It is highly unlikely that these landowners will grant a right-of-way to PFS that will permit rail transportation of high level nuclear waste across their land. Thus, it should be presumed that PFS will have to build an intermodal transfer facility at Rowley Junction and transport the nuclear waste to the proposed ISFSI by road.

d. Widening Skull Valley Road

If a rail spur from Rowley Junction to the facility is not feasible, the Applicant must use heavy haul trucks to move the casks from Rowley Junction to the facility. The trucks are anticipated to be twelve feet wide and weigh 142 tons when loaded, SAR at 4.5-4, while the existing Skull Valley Road is 22-24 feet wide with 0-3 feet aggregate shoulders. ER at 3.2-5. Apparently the Applicant intends to add a three feet paved surface to each side of Skull Valley Road to take the road 15 foot wide in each direction. The Applicant assumes that all road work (road widening, shoulder work, relocation of drainage culverts, etc.,) would take place within the existing road right-of-way. ER at 3.2-5. The Applicant also assumes that road improvements will be performed in cooperation with Tooele County.

The assumptions made by the Applicant are just that: assumptions. Under Utah Code Ann. § 27-12-133 a person is guilty of a misdemeanor if a right-of-way of any state highway or county road is "dug up or excavated .. or structures or objects of any kind or character [are] placed constructed or maintained within any such right-of-way" unless permitted by the appropriate authority. There is absolutely no indication that the Applicant may undertake widening a public road, moving drainage culverts, etc. solely

with the cooperation of Tooele County. Also there is no indication that Tooele County is in any way in accord with the Applicant's scheme. Furthermore, the Applicant has not even provided plat maps of the area to show the existing rights-of-way and whether such road widening is feasible. Finally, there is no justification that a 15 foot road is sufficient to accommodate the size and quantity of heavy haul trucks that will use Skull Valley Road over the life of the ISFSI.

Before the petitioners and NRC expend enormous amounts of time and resources on this license application, it is incumbent on the Applicant to show that it is entitled to widen the road, that the proposed road work is within the scope of existing public rights-of-way, that the casks containing spent nuclear fuel can be safely moved from the railhead 24 miles along on a 15-foot wide roadway to the facility in all weather and traffic conditions. To date, the application contains little more than the Applicant's hope to widened the road without any right to do so and without any discussion of why a 15-foot roadway would satisfy health, safety and environment concerns.

2. NRC Requirements

a. Part 75 Facility

The proposed PFS ISFSI is an installation subject to Part 75 and is eligible for IAEA safeguards under the US/IAEA Safeguards Agreement. 10 CFR §§ 75.2, 75.4.[9] The Commission must designate the PFS installation as subject to IAEA safeguards and require the Applicant to establish, maintain and follow written material accounting and control procedures. 10 CFR §§ 75.21, 75.41. The Applicant must comply with Part 75 requirements as part the Part 72 licensing proceeding, and provide information such as: identification of IAEA material balance areas and key measurement points; organizational responsibility for material accounting and control, including information with regard to separation of functions to provide internal checks and balances; devices designed to limit the mobility of nuclear material, the access of personnel, or the unauthorized operation of equipment and structural elements (including the design of building and the layout of equipment) which minimize and control access to nuclear materials. 10 CFR §§ 75.14, 75.4(e).

The requirements of Part 75 may implicate NRC's Part 72 review of the Applicant's management structure, access provisions and the certain safety and design features of the facility. Thus Part 75 must be addressed as part of the Part 72 license application and the Applicant must supplement its submittal with relevant Part 75 information.

3. Environmental Quality Standards and Requirements

[9] The definition of "installation" includes an ISFSI as defined in § 72.3. *See* 10 CFR § 75.4(k)(4).

a. Air Quality

The Applicant's air quality analysis does not satisfy the requirements of 10 CFR § 52.45. The Applicant has failed to adequately analyze whether it will be in compliance with the health-based National Air Quality Standards (NAAQS), whether it is subject to regulation under Section 111 of the Clean Air Act, and whether it is a major stationary source of air pollution requiring a Prevention of Significant Deterioration (PSD) permit. The Applicant's statement '[t]here are no air emission sources, including the emergency diesel generator, large enough to require a Clean Air Act, Title V permit, " falls far short of an adequate air quality analysis to satisfy the Clear Air or NEPA. *See* ER at 9.1-4

The Applicant's analysis of air quality impacts, ER 4.3.3, is totally inadequate. Although the Applicant fails to discuss modeling techniques, the Applicant references EPA "SCREEN3" at ER 4.8-2 so it is assumed that this is what the Applicant used to perform its air quality dispersion modeling analysis. The SCREEN3 model is inappropriate because it dilutes the impact of the project by spreading the emission releases over areas where the releases will not occur and during hours of the day when construction operations will not take place.[10] Also, the effects of terrain limit the directional flow of air. Thus, the persistency factor used in converting one-hour SCREEN3 modeled concentrations into 24-hour concentrations results in an under-prediction of the source's impact. The Applicant must complete a more refined

[10] While construction activities will be continuous throughout the initial license term and beyond, those activities will not occur 24 hours a day. Also, construction activities will not occur during the winter months. *See* ER at 3.2-2.

dispersion analysis and describe the source of input information and assumptions---such as monitored hourly meteorological data sets (wind speed, direction, stability class, temperature, and mixing height), source data, background concentrations, and other contributing industrial sources--to show that there will be no potential violation of NAAQS or significant air quality impacts off the Reservation.

The PFS facility is subject to regulation under § 111 of the Clean Air Act and may require a PSD permit. Construction will entail an onsite asphalt batch plant used for the construction of storage pads, cask shielding and concrete building(s). ER p, 3.2-2. The concrete batch plant is subject to § 111 of the Clean Air Act, and to 40 CFR Subpart I, New Source Performance Standards for Hot Mix Asphalt Facilities. As such, the PFS facility could be considered to be a major stationary source of air pollution required to obtain a PSD permit. See 40 CFR 52.21(b)(1)(i)(*b*), 52.21(c)(iii)(*aa*), and 60.90. If the PFS facility is required to obtain a PSD permit it will also be required to obtain a Title V permit. The Applicant must be required to complete a more rigorous analysis of the air quality impacts associated with its proposed facility. The Applicant must be required to complete a more rigorous analysis of the air quality impacts associated with its proposed facility.

Additionally, even if a PSD permit is not required, a state air quality approval order issued under Utah Code Ann. § 19-2-108 will most likely be required. The concrete batch plant, asphalt batch plant, and other air emission sources, even if located on the Skull Valley

reservation, because of the limited size of the reservation, will have a significant impact on state air resources. Therefore a state approval order will be required.

b. Groundwater discharge permit

The Applicant has not addressed the requirement to obtain a Utah Groundwater Discharge Permit. The State of Utah, as trustee and in its capacity of *parens patriae*, has jurisdiction over all groundwater within the State. Utah Code Ann. § 73-1-1. An Indian tribe may have an implied reservation of water under the Winters doctrine,[11] however, an implied right to the use of water under certain conditions does not restrict State jurisdiction over groundwater quality. Nor does NRC's authority under the Atomic Energy Act preempt State regulation of groundwater. *See* 42 U.S.C. § 2021(k); Pacific Gas & Electric v. Energy Resources Commission, 461 U.S. 190 (1983); Kerr-McGee v. City of West Chicago, 914 F.2d 820 (7th Cir. 1990). Furthermore, off-reservation effects caused by the Applicant--a non-tribal member--lends added support to the State's jurisdiction and control of groundwater quality. The Applicant has not addressed the requirement to obtain a Groundwater Discharge Permit in accordance with Utah Code Ann. § 19-5-107 and Utah Admin. Code R317-6.

c. Other Water Permits

The Applicant's analysis of other required water permits lack specificity and does not satisfy the requirements of 10 CFR § 52.45. In sections 9.1.3. and 9.2 of the ER, the Applicant merely states that it "might" need a Clear Water Act Section 404 dredge and

[11] *See* Winters v. United States 207 U.S. 564 (1908).

fill permit for wetlands along the Skull Valley transportation corridor, that it will be required to consult with the State on the effects of the intermodal transfer site on the neighboring Timpie Springs Wildlife Management Area. The fact that an Indian tribe may be treated as a state under the Clear Water Act is irrelevant to the discussion of permits because the Skull Valley Band of Goshutes has not applied for delegation of any Clear Water Act programs. ER at 9.1-4. The Applicant must describe with specificity the wetlands affected by its operations, the point discharge sources and the activities that may require control under a storm water permit.

The Applicant merely assumes that it will be able to drill wells for its water needs, which are estimated at 1,500 gallons per day. ER at 4.2-4. The Applicant must show that its has the legal authority to drill such wells and that its water appropriations do not interfere with or impair prior existing water rights. Furthermore, the Applicant does not specify whether the 1,500 gallons per day is a daily average or a peak usage estimate or whether that quantity of water will be required throughout the life of the facility.

U. Impacts of Onsite Storage not Considered

CONTENTION: Contrary to the requirements of NEPA and 10 CFR 51.45(c), the Applicant fails to give adequate consideration to reasonably foreseeable potential adverse environmental impacts during storage of spent fuel on the ISFSI site.[12]

BASIS: In a number of respects, PFS's application gives inadequate consideration to the potential adverse impacts of onsite spent fuel storage.

1. The ER fails to consider the impacts of overheating of casks due to the facility's inadequate thermal design. *See* Contention H (Inadequate Thermal Design), whose basis is adopted and incorporated herein by reference.

2. The ER fails to consider the safety risks and costs raised by PFS's failure to provide adequate means for inspecting and repairing the contents of spent fuel canisters, or for detecting and removing contamination on the canisters. These include risks to workers posed by handling or inspecting casks with contaminated or defective contents, during receipt of casks, storage of casks, or in preparing them for shipment to a repository. They also include health risks and increased costs during the decommissioning process. *See* Contention J (Inadequate Inspection and Maintenance of Safety Components, Including Canisters and Cladding), whose basis is adopted and incorporated herein by reference.

3. The ER fails to consider the risks posed by a blockage of the cooling vents on the storage casks. The concrete storage casks utilize passive, natural convective air

[12] This contention is supported by the Declaration of Marvin Resnikoff, attached hereto as Exhibit 2.

movement for cooling. SAR at 5.1-10, 5.4-1. Although the Applicant maintains that the ducts will be cleaned, this relies on human intervention, which is subject to error. It is reasonable to anticipate that the cleaning of ducts will be delayed or overlooked, or that an evacuation or fire will make it impossible to perform this function. Therefore, the Applicant must assess the consequences of an inadvertent blockage of the cooling ducts by animal or plant infestation, or by snow and ice during the winter.

4. The ER fails to consider the risks of a sabotage event in which one or more storage casks is or are breached. As discussed in Contention V (Inadequate Consideration of Transportation-Related Environmental Impacts), whose basis 3(b) (sabotage), is adopted and incorporated herein by reference, sabotage is a credible cause of a serious accident, and therefore should be considered in the Environmental Report and Environmental Impact Statement. This is true whether the spent fuel is onsite or in transit.

V. Inadequate Consideration of Transportation-Related Radiological Environmental Impacts.

CONTENTION: The Environmental Report ("ER") fails to give adequate consideration to the transportation-related environmental impacts of the proposed ISFSI.[13]

BASIS: NRC regulations at 10 CFR § 51.45(b)(1) require the Applicant's ER to address the impacts of the proposed action on the environment. Pursuant to 10 CFR § 72.108, the Applicant must also evaluate the impacts of spent fuel transportation within the "region" of the ISFSI. Petitioner submits that in order to comply with NEPA, PFS and the NRC Staff must evaluate all of the environmental impacts associated with transportation of spent fuel to and from the proposed ISFSI, including preparation of spent fuel for transportation to the ISFSI, transportation of spent fuel to the ISFSI, spent fuel transfers during transportation to the ISFSI, transferring and returning defective casks to the originating nuclear power plant, and transfers and transportation required for the ultimate disposal of the spent fuel.

The ER addresses the transportation-related impacts of the ISFSI in Sections 4.7 (radioactive material movement) and 5.2 (transportation accidents). According to PFS, the environmental impacts of spent fuel transportation are addressed in 10 CFR § 51.52 and the accompanying Summary Table S-4. ER at 4.7-1, 5.2-1. The ER uses the numerical values in Table S-4 for its evaluation of the transportation-related environmental impacts of the proposed ISFSI, claiming that these values are

[13] This contention is supported by the Declaration of Marvin Resnikoff, attached hereto as Exhibit 2.

conservative with respect to the scope of activities of the PFSF. Id. PFS also calculates the radiation doses caused by intercask transfer at Rowley Junction, and concludes that they are insignificant. ER at 4.7.1 and 4.7.2.

PFS's reliance on Table S-4 is inappropriate and inadequate in several respects. First, it is not supported by the regulations. Second, it is not conservative. Third, PFS ignores or minimizes significant impacts related to the transportation of spent nuclear fuel to and from the ISFSI. In addition, PFS's additional calculation of the impacts of inter-cask transfer at Rowley Junction is inadequate.

1. PFS's reliance on Table S-4 is inappropriate and inadequate.

a. Section § 51.52 applies only to construction permit applicants. PFS invokes 10 CFR § 51.52 as a regulatory basis for applying Table S-4 to its ISFSI application. By its own terms, however, 10 CFR § 51.52 applies only to nuclear power plant construction permit applicants. Nothing in Section 51.52 permits an applicant for an ISFSI to invoke the numerical values in Table S-4. Moreover, while 10 CFR § 51.53(d) permits licensees to incorporate environmental data submitted at the construction permit stage into post-operating-license applications for **onsite** spent fuel storage, the regulation makes no such provision for the use of the data in applications for offsite ISFSI applications

b. Even if 10 CFR § 51.52 applied, PFS does not satisfy the conditions for using Table S-4.

Moreover, even if 10 CFR § 51.52 were applicable, PFS has failed to show that the threshold conditions specified in 10 CFR § 51.52(a)(1)-(6) are met. PFS fails entirely to identify the specific plants whose fuel will be stored at the ISFSI or to provide any evidence that they satisfy the conditions of 10 CFR § 51.52(a)(1)-(6). For instance, § 51.52(a)(2) requires that the reactor fuel must be in the form of sintered uranium dioxide pellets having a uranium-235 enrichment not exceeding 4% by weight, and the pellets must be encapsulated by zircaloy rods. Section 51.52(a)(3) requires, *inter alia*, that the average level of irradiation of the irradiated fuel from the reactor must not exceed 33,000 megawatt-days per metric ton. PFS does not specifically state whether these requirements are met by the reactors whose fuel will be stored at the ISFSI. Instead, PFS cites a finding in the EIS for license renewal of nuclear power plants, that a burn up level of up to 60,000 MWd/MTU will not result in environmental impacts that are greater than the values currently in Table S-4, and that experience in handling fuel with burn ups over 55,000 MWd/MTU and up to 5.5% U-235 enrichment "has not revealed any unresolved safety concerns." ER at 4.7-2, *quoting* NUREG-1437, Generic Environmental Impact Statement for License Renewal of Nuclear Plants (May 1996). The statements in NUREG-1437 relied on by PFS were not incorporated into 10 CFR § 51.52(a), and thus they cannot be relied on absent an application for an exception to § 51.52(a). In any event, the conclusion in NUREG-1437 is incorrect. Higher burn ups have the result that a longer cooling time, up to 18 years, is necessary before fuel can be transported in the TranStor or Holtec casks. The need to calculate an appropriate

period of delay for shipment of spent fuel increases the chance for human error, by shipping fuel that is too thermally hot.

Section 51.52(a)(6) also incorporates the threshold conditions in Table S-4, including the condition that the weight of each shipping cask may not exceed 100 tons per cask per rail car, or 73,000 pounds per truck. As PFS acknowledges, the maximum weight of a loaded shipping cask is 142 tons, thus putting it outside the threshold limit for reliance on Table S-4. ER at 4.7-3. PFS's argument that the additional weight is insignificant must be rejected as an impermissible attack on the regulations. Moreover, the various arguments made by PFS as to why the additional weight is negligible are unsupported and unreasonable. For instance, PFS argues that an increase of 42 tons, or 42% per cask, is a negligible percentage of the overall weight of a typical train. This argument is not supported by any calculations or documentation. Moreover, it ignores the fact that heavier trains are more likely to lose braking on downgrades. Moreover, transportation casks, taken together with rail carriages, will weigh over 200 tons. Such heavy weights are not easily mixed with light loads in a mixed-use train. Conversation between Marvin Resnikoff, RWMA, and Robert Fronczak, American Association of Railroads (November 20, 1997).

PFS also appears to argue that the additional risk posed by a heavier cask is off-set by the reduction in the number of shipments resulting from the use of larger casks. Again, this argument is not supported by any calculation or documentation. Moreover, although the argument may have some merit with respect to incident-free transportation,

it is unreasonable with respect to transportation-related accidents. The heavier a cask is, the more difficult it will be to retrieve if it falls from a train, thus raising the risk of accidents. Moreover, once an accident occurs, the higher inventory of spent fuel inside the larger cask raises the consequences of a radiological release.

Additionally, the assumptions concerning traffic density in Table S-4 do not apply to the ISFSI. Table S-4 assumes no more than one truck shipment per day and no more than three rail shipments per month. In contrast, PFS projects 100-200 rail shipments per year. SAR at 1.4-2. This amounts to approximately 8-17 rail shipments per month, far in excess of the number of rail shipments assumed in Table S-4. The higher frequency of rail shipments significantly increases the potential for backup of trains and casks at Rowley Junction. If casks have to be stored at Rowley Junction awaiting transfer to trucks, both the radiation doses to workers and the public and the risk of accidents will increase. These impacts are not anticipated in Table S-4.

Thus, because it has not satisfied the conditions specified in 10 CFR § 51.52(a)(1)-(6), PFS must provide "a full description and detailed analysis of the environmental effects of transportation of fuel and wastes to and from the reactor." 10 CFR § 51.52(b).

2. The SAR is inadequate to supplement Table S-4.

WASH-1238 includes the dose to the truck crew, garagemen and freight handlers for a standard spent fuel shipment. But PFS's proposal involves additional handling of the fuel canisters and casks. At the originating reactors, the fuel canister must be placed

in a transfer cask for placement in a transportation overpack, transported to intermodal transfer point at Rowley Junction, Utah; then the transportation cask must be lifted onto a heavy haul truck, carted to the Canister Transfer Facility at the ISFSI in Skull Valley, and the fuel canister must then be transferred to a storage overpack.

In an apparent effort to supplement Table S-4, the SAR contains an analysis of the impacts of fuel transfer at Rowley Junction. Assuming that Table S-4 even applies, this analysis is inadequate in several respects. First, PFS assumes that there will be one cask on the Rowley Junction site every day. ER at 4.7-5. This assumption is unreasonable. As discussed in Contention B, given the high volume of rail shipments involved, it is likely that bottlenecks will form at Rowley Junction, and therefore it is likely that more than one cask will be stored onsite at any given time. PFS has failed to evaluate the potential for bottlenecks and their impacts with respect to incident-free handling and accidents. PFS has also failed to take into account the additional doses that will be incurred by State and Federal radiation inspectors.

Second, PFS fails to make any calculation for the impacts caused by the return of substandard or degraded casks to the originating nuclear power plant licensees. As discussed in Contention J, the design for the ISFSI contains no provision for a hot cell. Instead, PFS plans to return any substandard or degraded casks to the originating licensee. This will entail additional radiation doses to workers and the public, which are not considered in Table S-4 or the SAR. In addition, the shipment of fuel with degraded cladding increases the risk of accidents, since cladding is one of the barriers relied on to

contain the radioactivity in spent fuel. Finally, PFS does not consider the foreseeable risk posed by a cask drop accident in which a canister is dented or warped, and cannot be returned to its shipping cask. If this occurs, PFS has no provision for repacking the spent fuel.

Finally, PFS does not evaluate the environmental impacts of shipping spent fuel to the proposed ISFSI from nuclear power plants not serviced by any rail lines. Although PFS states that all fuel will be shipped to the ISFSI by rail, some of the plants it serves have no rail access. Those with sufficient crane capability may transfer the casks to heavy haul trucks, and from thence to rail cars. The impacts of these transfers are not assessed in the SAR. Moreover, there are some plants, such as Indian Point, which do not have sufficient crane capability to handle heavy shipping casks. The SAR does not state how these casks will be shipped to the ISFSI, or describe the impacts.

3. New information shows that Table S-4 grossly underestimates transportation impacts.

Table S-4 is based on WASH-1238, a 1972 report by the Atomic Energy Commission. The WASH-1238 study is poorly documented and outdated. Its conclusions regarding the probability and consequences of transportation accidents must be re-examined in light of the significant new information that is available.

Moreover, NRC regulations at 10 CFR § 51.45(c) require that, to the extent practicable, the costs and benefits of a proposal should be quantified. WASH-1238 makes no attempt to quantify the risks of spent fuel transportation, but merely asserts

that they are low. Now that additional data have been collected on accident risks and transportation conditions, this rationale is no longer acceptable. The NRC must prepare a new EIS that takes into account current information, and quantifies the risks posed by spent fuel transportation.

a. Poor and outdated data. The data on which the WASH-1238 risk estimate is based are slim to none. For accident speeds, WASH-1238 refers to an unpublished DOT study, for which the data are unavailable. For major fires, no reports are cited. *See* WASH-1238 at 67. Clearly, highway and rail conditions have changed since 1972. There are more interstate highways, and cars use higher speeds. Freight traffic on the rails has also increased in recent years. However, WASH-1238 contains no data that can be compared with data for current conditions. Thus, it does not provide a reasonable basis for conclusions about highway or rail conditions.

b. New information and changed circumstances. WASH-1238's conclusion that the probability of a severe accident is very small is based on an overly narrow range of accidents. For instance, it does not include accidents caused by human error or sabotage. While there was very little information on these subjects in 1972, significant experience and technical studies have been collected since then.

Sabotage. Since the time when WASH-1238 was prepared, the threat of sabotage has become more real and the technology more sophisticated. The bombings at the World Trade Center and the Federal Courthouse in Oklahoma City have vividly demonstrated the credibility of sabotage as a very real threat. Moreover, expert studies

have demonstrated the credibility of this threat with respect to nuclear waste transportation. *See, e.g.*, Halstead and Ballard, Nuclear Waste Transportation Security and Safety Issues; The Risk of Terrorism and Sabotage Against Repository Shipments, for the Nevada Agency for Nuclear Projects (October 1997), Exhibit 3; Tuler, Kasperson and Ratick, The Effects of Human Reliability in the Transportation of Spent Nuclear Fuel (Clark University: June 1988), attached hereto as Exhibit 16. Irradiated fuel storage casks, while extremely sturdy, can be compromised by anti-tank weapons or commonly available explosive devices. For example, as discussed in Richard Barbour, Pyrotechnics in Industry at 47-48 (McGraw-Hill, New York: 1981), attached hereto as Exhibit 17, a simple conical charge weighing 743 grams, 15 cm in length, can penetrate 356 mm of mild steel (lead would be simpler) with a hole diameter 45 mm. These devices should be readily available since they are used by the oceanographic industry for cable cutters, construction contractors for drilling aids and the steel industry for tapping open-hearth furnaces. To create greater mischief, the conical shaped charge can be combined with an incendiary pellet. After the explosive punches a hole through metal, the incendiary pellet is pulled through the blast hole and burns at 1649 °C. Id. at 53. This would serve to fragment fuel rods and pellets, vaporize semi-volatile radionuclides such as cesium, and release radioactivity from the cask due to overpressure. A modern shoulder-fired anti-tank weapon can penetrate over 16 inches of armor plate. The most common shoulder-held anti-tank weapons have effective ranges over 500 meters, with sights for night use. The VSC-24 is constructed of only 2 1/2 inches of steel plate (1 inch in the MSB and 1

1/2 inches forming the inside of the concrete silo) and could be easily punctured. The TranStor and Holtec casks are similar to the VSC-24. The TOW 2 anti-tank missile can penetrate greater than 27 inches of armor and has an effective range of 3.75 kilometers; the Milan anti-tank missile can penetrate more than 39 inches of armor and has an effective range up to 2 kilometers. Exhibit 3, Halstead and Ballard, Nuclear Waste Transportation Security and Safety Issues at 59 - 61. The threat of sabotage is a real and foreseeable risk that should be evaluated in assessing the impacts of transportation of spent nuclear fuel.

Human error. WASH-1238 assumes a perfect container and perfect operation in an imperfect world. Casks are not necessarily built according to design. On October 6, 1997, for example, the NRC Staff issued a Demand for Information to Sierra Nuclear Corporation, manufacturer of the TranStor cask, citing numerous deficiencies in the construction of SNC's VSC-24 cask. Demand for Information, EA No. 97-441, PDR Document, ACN # 9710100120. These deficiencies are so severe that NRC has demanded that SNC demonstrate why it should not be forbidden from constructing the casks. Id. The following are additional examples:

In 1979, the NRC discovered NAC-1 shipping casks had not been constructed to design specifications. They were bowed out of shape, and additional copper plates had been welded on to increase radiation shielding, without permission by the NRC. *See* Resnikoff, M. and Audin, L., The Next Nuclear Gamble at 206-210 (Council on Economic Priorities: 1983), attached hereto as Exhibit 18.

An NLI-1/2 cask, holding one PWR fuel assembly, was to have been shipped dry, but a worker incorrectly filled the cask with water. Letter from William Parker, Duke Power, to John Davis, NRC (December 1, 1981), PDR Document, ACN # 8112140019.

In May of 1980, a fuel assembly exceeding heat output conditions in the Certificate of Compliance was shipped from Haddam Neck to Battelle Columbus, and contaminated the spent fuel pool. The UO_2 had oxidized into U_3O_8. Memorandum to John Davis, NRC, from Robert Minogue, NRC (March 5, 1984), attached hereto as Exhibit 19. Yet human error is not factored into accident probabilities in WASH-1238.

Maximum credible accidents. WASH-1238 also does not include up-to-date analyses of maximum credible accidents. *See* Wilmot, Transportation Accident Scenarios for Commercial Spent Fuel, SAND80-2124 (1981), attached hereto as Exhibit 20**.** WASH-1238 does not consider the dynamics of a transportation accident, as done by Wilmot and later authors. In an impact followed by a fire, the fuel cladding may burst on heating, or shatter upon impact. The fuel may oxidize under heat and an air environment. Wilmot at 32 - 38. WASH-1238 also does not take into account more recent information regarding the risks of rail transportation. For instance a 1985 analysis by Rogers & Associates projected a maximum clean-up cost of $620 million and a cleanup time of 460 days for a rail accident (14 PWR fuel assemblies/cask) in a rural

area.[14] The population exposures ranged up to 63,000 person-rems in the most severe rural accident. PFS does not mention a study by Sandia National Laboratory of irradiated fuel shipping accidents in urban areas, in which costs over a $1 billion are calculated.[15] Other studies show that falls from high bridges are a significant contributor to the risk of severe rail accidents. The fall of a spent fuel cask from a railroad bridge into a muddy river bottom could pose a very severe risk to the public if the cask was buried by the mud and overheated. As shown in calculations for the TN-40 shipping cask, if a cask is buried in sediment, it can rapidly overheat. The cask, which has a maximum heat load of 27 kW, is predicted to double its temperature in just 120 hours.[16] Thus, a successful salvage operation must be rapid, which is not simple for a 142-ton object. This is a foreseeable and significant risk which should be, but has not been, taken into account in WASH-1238 and Table S-4. Another potentially catastrophic accident involves a severe impact or fall from a bridge into a rocky river bottom, in which water enters the cask and the nuclear fuel goes critical. Casks which hold 24 PWR fuel assemblies hold more than a critical mass of fissionable material. WASH-1238

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[14] Sandquist, GM et al, Exposures and Health Effects from Spent Fuel Transportation, prepared by Rogers & Associates for the DOE (November 1985), attached hereto as Exhibit 21.

[15] Finley, NC et al, "Transportation of Radionuclides in Urban Environs: Draft Environmental Assessment," prepared by Sandia National Laboratories for the NRC, NUREG/CR-0743 (July 1980), attached hereto as Exhibit 22.

[16] Northern States Power Company, "TN-40 Safety Analysis Report," Docket 50-282, September 1991, fig. 3.3-15.

argues that, "Although the consequences of a release could be very serious, the probability of occurrence is small, and therefore the risk or impact on the environment is very small." Id. at 74. As discussed above, the probability of a release is reasonably foreseeable, and therefore should be considered. In any event, it is important to note that risk is a product of probability and consequences, and that a low probability of occurrence does not in any way mitigate the impact if such an accident were to occur.

Degradation of fuel cladding. WASH-1238 assumed that irradiated fuel would be stored under water in pools for a short period, and then, individual fuel assemblies would be shipped by truck (1 PWR or 2 BWR fuel assemblies) or by train (7 PWR fuel assemblies) to a reprocessing plant. In contrast, PFS asserts that all spent fuel will be stored onsite for at least five years. ER at 4.7-2. Some of this fuel is likely to have been stored in dry casks prior to shipment. Additionally, 6,000 fuel assemblies are projected to be in dry storage by 1999,[17] out of over 100,000 discharged assemblies to date.[18] Long-term dry storage before fuel is shipped to Utah may degrade fuel cladding. Based on Pescatore, "Zircaloy Cladding Performance Under Spent Fuel Disposal Conditions," BNL-52235, April 1990, the maximum cladding temperature for dry storage

[17] Energy Information Administration, "Spent Nuclear Fuel Discharges from U.S. Reactors 1994," SR/CNEAF/96-01, US DOE, at 46 (February 1996), attached hereto as Exhibit 23.

[18] Id., at xiii.

within a VSC or NUHOMS concrete storage cask can reach the same temperature as while a power reactor is operating, about 360°C. But in dry storage these high temperatures can cause cladding degradation, because unlike an operating power reactor, the pressure from within the fuel rod is not balanced by pressure from outside the cladding. This net outward pressure is responsible for creep corrosion cracking of fuel cladding. During transportation, weakened cladding increases the likelihood of impact rupture and burst rupture of fuel cladding in a severe accident. Irradiated fuel that remains in a fuel pool until shipment to a reprocessing plant does not experience the potentially damaging environment of dry storage. Therefore WASH-1238 may not apply to fuel that is to be shipped to the PFS.

Accident consequences. Recent analyses suggest that during a severe accident, a greater fraction of cesium-137 may be released than estimated in WASH-1238. WASH-1238 assumes 650 Ci of fission products are released; for cesium-137, the estimated WASH-1238 release is approximately a fraction 5×10^{-5} of the cesium-137 cask inventory. More recent analyses assume a cesium-137 fraction of 10^{-3} could be released, that is a fractional release 20 times greater.[19] Since the cesium-137 inventory of the TransStor is a factor of 3.4 greater than assumed in WASH-1238, the amount of cesium-137 that can be expected to be released from a TranStor in a severe accident is approximately 68 times the WASH-1238 results.

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[19] Wilmot, EL, at 35, Exhibit 20.

Regional Characteristics. WASH-1238 does not separately estimate the consequences of an accident in a specific location, or even limit the analysis to an urban or rural area. It is a generic calculation. (p.3) Thus, it is inadequate to satisfy the requirement of 10 CFR § 72.108, that the EIS must take regional characteristics into account. For example, it fails to estimate the consequences of a severe rail accident in Salt Lake City, a high population area.

Criticality. The TranStor and HI-STAR 100 casks which PFS proposes to use hold more than a critical mass of fuel (17 PWR assemblies). This stands in contrast to the assumption underlying WASH-1238 and Table S-4, which is 7 PWR assemblies for a train cask, an amount less than a critical mass. To insure that a cask cannot go critical under any circumstances, cask manufacturers would need to include neutron absorbing material between fuel assemblies or demonstrate that a cask could not go critical. The nuclear industry has been attempting to convince the NRC Staff to give "burn up credit" arguing that used fuel assemblies would have less fissionable material and therefore there is less need for neutron absorbing material. If the nuclear industry is successful in lobbying for burn up credit, then the decision as to when fuel is sufficiently used up to justify shipment becomes essentially a management decision. This is an additional source of human error, in which mistakes could lead to criticality accidents. A criticality event, in which fuel is re-arranged and water enters the cask, would be far outside the envelope of consequences assumed in Table S-4 and NUREG-170.

RADTRAN. WASH-1238 predates the RADTRAN computer code, which is significantly more accurate and generally shows much higher radiological doses to the general public. WASH-1238 assumes a member of the general public would spend three minutes at an average distance of three feet from the truck or railcar and that ten persons would be so exposed during shipments. But railcars go through the center of cities and trucks would gather great attention at truck stops. RADTRAN allows the user to enter parameters for the number of persons at a rest stop, the stop time, the distance of onlookers from the cask, and the number of stops per mile. The standard default assumption by RADTRAN is 50 persons at a rest stop. In addition, the user can input the velocity in each population zone, the number of persons per vehicle, the fraction of urban travel during rush hour, the traffic density. Using RADTRAN default assumptions, the incident-free exposures under RADTRAN lead to much higher exposures than estimated under Table S-4. In light of the availability of the much more accurate dose modeling RADTRAN program, and the likelihood that it will show significantly higher dose than WASH-1238, the Applicant's reliance on WASH-1238 and Table S-4 is inadequate to demonstrate compliance with NEPA.

Transportation Distance. WASH-1238 is based on a transportation distance of approximately 1,000 miles. Id. at 38. But as PFS acknowledges, the distance may be more than twice that amount. ER at 4.7-3. Most spent fuel is located at reactors in the Eastern United States, which implies transportation distances much greater than

1000 miles.[20] For example the one way mileage from Boston Massachusetts to Salt Lake City is 2388 miles.[21] PFS cites NUREG-1437 for the proposition that this increase is inconsequential. However, in light of all the deficiencies in WASH-1238, this is not a valid assertion. Doses must be recalculated for the entire shipping distance from plants to the ISFSI, and from the ISFSI to the repository, for all 19 plants served by the proposed ISFSI.

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[20] Spent Nuclear Fuel Discharges from U.S. Reactors 1994, U.S. Department of Energy, Energy Information Administration, SR/CNEAF/96-01 at xiv (February 1996), Exhibit 23.

[21] Gousha New Deluxe Road Atlas, HM Gousha, New York, 1995.

W. Other Impacts not Considered.

CONTENTION: The Environmental Report does not adequately consider the adverse impacts of the proposed ISFSI and thus does not comply with NEPA or 10 CFR § 51.45(b).

BASIS: The Environment Report must contain a description of the "impact of the proposed action on the environment." 10 CFR § 51.45. The Applicant has failed to consider impacts with respect to the following:

1. **Cumulative Impacts**. The Applicant does not discuss the cumulative from hazardous and industrial activities located in the region of the ISFSI site and the Intermodal Transfer site. *See* Contention K (Inadequate consideration of credible accidents) whose basis is incorporated by reference herein.

An accident involving spent fuel casks may cause facilities such as the Army's chemical weapons incinerator (TOCDF) to be evacuated. Conversely, an accident at TOCDF may cause evacuation of the ISFSI or the intermodal transfer site. In any event, the cumulative impacts of this facility in relationship to other facilities has not been considered.

2. Risk of Accidents along the Transportation Corridor. Heavy haul trucks could make up to 400 trips per year along Skull Valley Road, a secondary two-way paved road. The potential for accidents from these vehicles has not been evaluated.

3. **Flooding.** The Applicant has not considered the impact of flooding on

its facility or the Intermodal Transfer Point. See Contention N (Flooding), whose basis is incorporated herein by reference.

4. **Pollution**. Construction, operation and maintenance of the ISFSI will cause degradation of air quality and water resources. See Contention T (Inadequacy of Required Permits and other Entitlements) Basis 3 (Environmental Quality Standards and Requirements) which is incorporated by reference into this contention. Such impacts are inadequately discussed.

5. **Seismic**. The site chosen by the Applicant is one with complex seismicity, capable faults and potentially unstable soils. *See* Contention L (Geotechnical) whose basis is incorporated herein by reference. The impact of placing 4,000 casks over such a site is not fully assessed.

6. **Visual.** The Applicant has not adequately considered the cost of the visual impact the proposed ISFSI and the continual (up 200 shipments per year) transportation of spent fuel by heavy haul truck along Skull Valley Road and transportation of spent fuel will have on the public's use and enjoyment of the area. The Applicant states that the ISFSI "will not significantly interrupt views across the Skull Valley floor." ER at 4.1-19. The Applicant goes on to state that the "presence of the construction equipment in an otherwise barren landscape will naturally draw the viewer's attention as a temporary focal point." Id.

While the Applicant may considers the area a "barren landscape," the esthetic use and enjoyment of the area by the public, should nonetheless be analyzed. The application does not take into account how the visual impact of its facility and the transportation of

casks along Skull Valley Road will have in detracting from visitors' enjoyment of Deseret Peak, the Deseret Wilderness Area and the Wasatch National Forest in the Stansbury Mountains. Furthermore, the Applicant has not addressed how its activities will impact the public's esthetic enjoyment of public lands and Horseshoe Springs, located directly off Skull Valley Road and 15 miles north of the ISFSI. Public access is allowed on the public lands located adjacent to the site and managed by the Bureau of Land Management. ER at 2.2-3. Typical activities enjoyed by the public include "off-highway vehicle use," camping, and hunting. Id. Horseshoe Springs is a protected recreational area with ponds and hiking trails where typical activities include fishing, hunting, and bird watching. ER at 2.2-3. Id. The Applicant must objectively consider and impact that its facility and transportation of casks will have on these activities.

X. Need for the Facility

CONTENTION: The Applicant fails to demonstrate there is a need for the facility as is required under NEPA.[22]

BASIS: As support for its need for the facility, the Applicant merely recites that reactor sites are physically or economically unable to meet their anticipated spent fuel storage requirements. ER 1.2. There is no substantiation of these statements. To the contrary, one of the PFS consortium members, Northern States Power, says that it has enough room at its existing on-site storage facility for all the storage containers the plant will need.[23] Even the Applicant acknowledges that most reactors have been able to add additional storage capacity by reracking and by constructing on site dry spent fuel storage. ER at 1.2-1.

The Applicant's underlying premise is that the owners of nuclear reactors will be in a substantially superior economic position if they can ship their spent nuclear fuel half way across the country to a centralized storage facility in Utah. The Applicant's own words in the Environmental Report, "Need for the Facility" (ER pp. 1.2-1,2), illustrate that economic advantage to a select group is the driving need for this facility:

> [R]eactors that have reached the end of their operating life must also provide spent fuel storage until the spent fuel can be shipped off-site. Until such off-site shipment takes place, the reactor site cannot be completely decommissioned. Particularly in those situations where all reactors at a site

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[22] This contention is supported by the Declaration of Lawrence A. White, attached hereto as Exhibit 1.

[23] *See* Northern States Power home page "Prairie Island Spent Fuel Storage FAQ" at *http://www.nspco.com/nsp/spntful.htm#q13.*

> have been permanently shut down, the absence of an off-site option for spent fuel storage will result in the added costs of maintaining a licensed site.... [The PFS facility] would also provide insurance for situations where increased on-site storage might by physically possible but economically disadvantageous.[24]

This limited benefit is insufficient to justify the need for the facility.

The application is for storage of spent nuclear fuel rods from domestic power reactors located throughout the United States. The application must, therefore, discuss the national need for storage at its proposed facility. Rather than unsupported and generalized statements about on-site storage capacity and storage costs, the Applicant should at least detail and substantiate for each reactor site, the present and projected quantity of spent nuclear fuel, the projected storage capacity, the cost of on-site storage, the specifics of state-imposed restrictions and whether those restrictions are preempted by federal law.

Furthermore, the Applicant also refers to premature plant shutdown because of the fear that utilities may not be able to obtain state approval for onsite storage. ER 8.1-2,3. However, the Applicant fails to give any basis for this fear and, thus, it must be rejected as mere speculation.

Y. Connected Actions

[24] Under this approach, the Applicant is running afoul of NEPA. Rather than isolate the costs or benefits to a particular group as Applicant does, NEPA requires overall benefits to be weighed against overall costs. Detroit Edison Company (Enrico Fermi Atomic Power Plant, Unit 2), LBP-78-11, 7 NRC 381, 391 (1978).

CONTENTION: The Applicant fails to adequately discuss the link between this proposal and the national high level waste program, a connected action, as is required under NEPA.[25]

BASIS: Given that this proposal is for storage of spent nuclear fuel rods located throughout the United States, it is tightly linked to the previous and pending decisions of DOE's high level waste program. As connected actions, this proposal and other high level waste decisions need to be considered together to ensure that the cumulative effects of these actions are properly evaluated. 40 CFR § 1502.4.

The Applicant links the need for the facility to DOE's inability to accept spent fuel by January 1998, by stating that it will be at least a decade before utilities can make spent fuel deliveries to DOE. ER at 1.2-1. While the 1987 amendments to the Nuclear Waste Policy Act of 1982 authorize DOE to construct a monitored retrievable storage (MRS) facility, the siting and construction of the MRS was linked to the schedule for developing a high level waste repository. There are currently both House (HB 1270) and Senate versions of congressional bills to authorize construction of an MRS in Nevada near the Yucca Mountain repository site.

Implementation of the proposed action will commit the government to one of many alternative courses of action for dealing with high level waste disposal in general, thus eliminating or discouraging other alternatives that may result in fewer or lower adverse environmental impacts. For instance, the proposed ISFSI project does nothing to advance

[25] This contention is supported by the Declaration of Lawrence A. White, attached hereto as Exhibit 1.

the ultimate objective of safely disposing of radioactive waste. Instead, it adds significant cumulative impacts caused by transporting spent fuel across the country to Utah and then moving the fuel to wherever a final repository will be located. These impacts could be avoided by leaving the fuel onsite until a repository is ready. As another connected action, the Applicant needs to consider the implication that the Skull Valley site will become a de facto permanent repository for spent fuel casks. NRC will not fulfil its NEPA responsibilities if it does not address these issues.

Z. No Action Alternative

CONTENTION: The Environmental Report does not comply with NEPA because it does not adequately discuss the "no action" alternative.[26]

BASIS: NEPA requires a discussion of the no action alternative, 40 CFR § 1502.14(2). To satisfy NEPA, the NRC must consider the environmental consequences of not undertaking the action at all or of continuing with the current plans and management regime. The Applicant's Environmental Report can not be used to meaningfully discuss the no build alternative, because the Applicant focuses solely on the perceived disadvantages of the no build alternative. *S*ee footnote 41 NEPA requires that the no action alternative be included in the analysis to serve as a baseline and basis of comparison with the proposed action and other alternatives. By not properly considering the no build alternative, the Applicant fails to provide the balanced comparison of environmental consequences among alternatives. For example, the application does not consider the advantages of not transporting 4,000 casks of spent fuel rods thousands of miles across the country, not enhancing the potential for sabotage at a centralized storage facility, not increasing the risk of accidents from additional cask handling, etc. An example of the Applicant's tunnel vision is the following statement: "The construction of additional onsite ISFSIs at plant sites will result in more sites disturbed and greater environmental impact than constructing one site in a remote, desert environment." ER at 8.1-3. The "remote desert environment" referred to be the Applicant is thousands of miles from ANY domestic nuclear power reactor and

[26] This contention is supported by the Declaration of Lawrence A. White, attached hereto as Exhibit 1.

twenty four miles from the nearest railhead. The Applicant fails to discuss the considerable safety advantages of storing spent fuel near the reactors, whose spent fuel pools will be available for transfers or inspections of degraded fuel. *See* Contention J (Inspection and Maintenance of Safety Components) . In contrast to expansion of onsite storage capacity within the reactor basin and any environmental disturbance that may entail, the "remote desert site" chosen by the Applicant is an undisturbed site used primarily for grazing and an area of cultural and historical significance to a number of groups, including Native Americans.

NRC cannot rely on the Applicant's inadequate and one-sided discussion of the no build alternative. Thus, NRC will not satisfy NEPA if it does not adequately address all sides of the no action alternative. City of Tenakee Springs v. Clough, 915 F.2d 1308, 1312 (9th Cir. 1990)(agency's failure to consider alternatives is contrary to law); Bob Marshall Alliance v. Hodel, 852 F.2d 1223, 1228 (9th Cir. 1988)(failure to discuss no-action alternative improper), *cert. denied*, 489 U.S. 1066 (1989); Van Abbema v. Fornell, 807 F.2d 633, 640-43 (7th Cir. 1986)(court remanded because agency did not discuss no-build alternative); Getty Oil Co. v. Clark, 614 F.Supp 904, 920 (D. Wyo. 1985) (upholding remand by appeals board because agency failed to discuss no-action alternative).

AA. Range of Alternatives

CONTENTION: The Environmental Report fails to comply with the National Environmental Policy Act because it does not adequately evaluate the range of reasonable alternatives to the proposed action.[27]

BASIS: NEPA requires consideration of all reasonable alternatives, 40 CFR § 1502.14, and it is well established that alternatives are at the heart of an EIS. Calvert Cliffs' Coordinating Committee, Inc. v. Atomic Energy Commission, 449 F.2d 1109 (DC Cir. 1971).

The discussion of siting alternatives in Chapter 8 of the Environmental Report is woefully inadequate. The Applicant first developed a list of sites based on whether the site was included on the original list of applicants to the Nuclear Waste Negotiator's office or whether the entity directly expressed an interest to PFS. ER at 8.1-2. Out of this came a list of 38 separate sites. Table 8.1-1. At least 20 of these sites appear to be located on an Indian reservation. The Applicant's basis for coarse screening seems to be the following:

> The key requirements of a candidate site in this phase included: a willing jurisdiction public acceptability reasonable distance to know capable seismic faults and reasonable known ground accelerations, reasonable site flooding conditions, and favorable proximity to transportation access. Any jurisdictional restriction that would prohibit the facility was used as an exclusion factor.

ER at 8.1-4.

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[27] This contention is supported by the Declaration of Lawrence A. White, attached hereto as Exhibit 1.

The second screening phase apparently involved regulatory criteria, however, there is no discussion or tabulation of the results from phase two screening. The most confusing part of the Applicant's site section is the third phase.[28] Apparently, the Applicant used a questionnaire to determine site suitability. *See* Table 8.1-2. There is no mention of whether the Applicant sent the questionnaire to all 38 site owners or just to the Skull Valley Band of Goshutes. There is absolutely no discussion or tabulation of the responses to the questionnaire, if in fact the Applicant received any responses. The Applicant discusses "the remaining (3) candidate sites" (*see* n.* 2) but the reader is absolutely baffled to understand what "three" sites the Applicant refers to because the only sites mentioned by name are the 38 initial sites and the two sites located on the Skull Valley reservation. The final screening final phase was to choice between two sites on the Skull Valley reservation that were almost contiguous to each other. *See* Fig. 8.1-2.

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[28] The full text of Applicant's third phase, ER at 8.1-5, is as follows:

> The third phase, Candidate Area Selection, was used to identify at least two candidate siting areas that would likely meet NRC licensing regulations, and would not be unreasonably expensive to develop. At least two sites were desired in order to have an alternate choice should problems with the primary site develop further into the process. The evaluation process used in this phase utilized two primary methods. First, a list of detailed questions (Table 8.1-2) intended to determine site suitability was sent to the owners/promoters of the remaining (3) [sic] candidate sites. Second, a major engineering firm familiar with nuclear construction issues was to be engaged to conduct a field evaluation visit to each of the remaining (3) [sic] candidate sites. A set of requirements, exclusion factors, avoidance factors and preference factors was developed for the phase three evaluation.

The Applicant's overarching criterion seems to be a willing jurisdiction. The Applicant's "screening" process jumped from 38 sites to two sites located almost next to each other on the Skull Valley reservation. How the Applicant arrived at the two sites is a mystery. The application of 10 CFR Subpart E, §§ 72.90-108, Site Evaluation Factors, to the candidate sites are not discusses at all in the Environmental Report. Major omissions include failure to consider the adequacy of transportation corridors as well as accident and risk analyses.

The NRC cannot rely on the Applicant's site selection criteria because it has not been applied at all levels of screening. Furthermore, information used in the screening process has not been described and tabulated. Thus, the siting criteria in the Environmental Report is fatally flawed, and fails to demonstrate that the Applicant fully and objectively considered the range of alternative sites available to it.

BB. Site Selection and Discriminatory Effects

CONTENTION: The Applicant's site selection process does not satisfy the demands of the President's Executive Order No. 12,898 or NEPA and the NRC staff must be directed to conduct and thorough and in-depth investigation of the Applicant's site selection process.

BASIS: The Agency's Responsibility under the President's Executive Order No. 12,898, is to make achieving environmental justice part of its mission.[29] The Presidential Order further directs agencies to conduct their activities without discriminating against low income and minority populations.[30] The Commission has voluntarily agreed to implement the President's directive on environmental justice.

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[29] In Executive Order 12898, Subsection 1-101, "Agency Responsibilities," the President directs that

> [t]o the greatest extent practicable and permitted by law . . . each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States.

3 CFR at 859.

[30] In section 2.2 of the Executive Order, the President orders that

> [e]ach Federal agency shall conduct its programs, policies, and activities that substantially affect human health or the environment, in a manner that ensures such programs, policies, and activities do not have the effect of excluding persons (including populations) from participation in, denying persons (including populations) the benefits of, or subjecting persons (including populations) to discrimination under, such programs, policies, and activities, because of their race, color, or national origin.

Id. at 861.

In addition, NEPA mandates that the NRC must evaluate the Applicant's siting process to ensure the site selection is free from discrimination. NEPA guarantees procedural protections to "all" persons and does not brook subjecting some people to environmental impacts not suffered by others. *See* 42 USC § 4221(c) ("each person should enjoy a healthful environment."). *See also* §§ 4331(b)(2), 4332. Furthermore, courts have made it clear that biased decisionmaking will not be tolerated. Clavery Cliffs Coordinating Comm. v. AEA, 449 F.2d 1109, 1115 (D.C. Cir. 1971). Thus, any discriminatory effects in the site selection process must be evaluated under both NEPA and the President's Executive Order.

The Atomic Safety and Licensing Board left no doubt in Louisiana Energy Services, L.P. (Claiborne Enrichment Center), LBP-97-9, 45 NRC 367 (1997) (hereafter "Claiborne") that the NRC is obligated to carry out, in good faith, the President's Executive Order on Environmental Justice in its activities that substantially affect human health and the environment. The Board found the President's Executive Order applicable to NRC licensing actions because those actions substantially affect human health and the environment.

As in the Claiborne case, where progression of the site selection process and narrowing of the search raised, dramatically, the level of minority representation in the population, the Applicant's search had been focused disproportionately on areas of high minority populations. As discussed above, the Applicant started its site selection with 38 sites, over 20 of which were located on Indian reservations and ended up with two closely

located sites on the Skull Valley reservation. This raises an inference of discrimination in the site selection process. The NRC may not approve the selection of the Skull Valley site without conducting a thorough and in-depth investigation of the Applicant's siting process to ensure the site selection was not discriminatory. Claiborne, 45 NRC at 391.

CC. One-Sided Costs-Benefit Analysis

CONTENTION: Contrary to the requirements of 10 CFR. § 51.45(c), the Applicant fails to provide an adequate balancing of the costs and benefits of the proposed project, or to quantify factors that are amenable to quantification..

BASIS: The Applicant's Environmental Report makes no attempt to objectively discuss the costs of the project. Other than the financial costs incurred by the Applicant in constructing and operating the facility, the sum and substance of the Applicant's discussion of costs are as follows:

> The indirect costs, which are derived from the socioeconomic and environmental impacts of the facility, are minimal due to the remote location and small size of the actual storage area.

ER at 7.3-1. This brief discussion is completely inadequate to satisfy the requirements of 10 CFR. 51.45(c). The Applicant fails to weigh the numerous adverse environmental impacts discussed, for example, in Contentions H through P above, against the alleged benefits of the facility.

Moreover, the Applicant fails to compare the environmental costs of the proposal with the significantly lower environmental costs of the no-action alternative. In addition, the Applicant fails to weigh the benefits to be achieved by alternatives that could reduce or mitigate accidents, environmental contamination, and decommissioning costs, such as inclusion of a hot cell in the facility design (Contention J).

Finally, the Applicant makes no attempt to quantify the costs associated with the impacts of the facility. Many such costs are amenable to quantification: for instance,

costs related to accidents and contamination may be quantified in terms of health effects and dollar costs; decommissioning impacts can be quantified; visual impacts can be quantified in terms of lost tourist dollars; and emergency response costs can be quantified based on the cost of those services.

Given the lack of an adequate cost-benefit analysis, the Applicant provides no meaningful basis for a comparison of alternatives. Therefore, the application must be rejected as insufficient to satisfy NEPA.

DD. Ecology and Species

CONTENTION:

The Applicant has failed to adequately assess the potential impacts and effects from the construction, operation and decommissioning of the ISFSI and the transportation of spent fuel on the ecology and species in the region as required by 10 CFR §§ 72.100(b) and 72.108 and NEPA.

BASIS: The Applicant has failed to adequately assess ecological impacts from proposed activities, impacts on species, and impacts on specific habitats. The underlying deficiency is the failure to perform surveys and studies to acquire the necessary information to make an adequate assessment.

1. Impacts from Proposed Activities:

a. Construction Activities. The Applicant indicates that construction activities will "temporarily disturb resident wildlife species." ER at 4.1-4. The Applicant does not discuss the long term impacts to the overall ecological system in Skull Valley. The impact from construction will not be temporary because the Applicant plans to have ongoing construction for over twenty years. ER at 4.1-4 to 5. **b. Retention pond and water management**. The Applicant has failed to address the adverse impacts as a potential result of contaminated ground or surface waters, including contaminated puddles and ponds, on various species. *See*, Contention O, Hydrology. The Applicant has not indicated an intent to sample the retention pond or prevent the retention pond from draining in the event contaminates are present. Thus, the Applicant cannot support the argument that "[s]urface runoff is uncontaminated and will not adversely affect vegetation or wildlife." ER at 4.2-2. Moreover, the Applicant does not address

any water born radioactive, chemical, or heavy metal contaminants that may be absorbed by wildlife, aquatic organisms, or vegetation.

c. Prevention or Mitigation Measures. The Applicant has failed to propose and develop various protective or mitigation plans in conjunction with the appropriate authorities. The Applicant's plans include a mitigation plan for Horseshoe Springs and protective plan for Salt Mountain Springs developed with the U.S. Bureau of Land Management, mitigation plans for Timpie Springs Waterfowl Management Area and protection of raptor nests developed with the Utah Division of Wildlife Resources. ER at 4.3-3 to 4. The protective or mitigative measures must be identified now so they can be evaluated and the feasibility of the proposed ISFSI site determined.

2. Impacts on Species

The Applicant has not estimated potential impacts to ecosystems and "important species." A species is "important":

> if a specific causal link can be identified between the nuclear power station [or in this case an ISFSI] and species and if one or more of the following criteria applies: (a) the species is commercially or recreationally valuable, (b) the species is threatened or endangered, (c) the species affects the well-being of some important species within criteria (a) or (b), or (d) the species is critical to the structure and function of the ecological system or is a biological indicator of radionuclides in the environment.

NRC Regulatory Guide 4.2, Preparation of Environmental Reports for Nuclear Power Stations, Revision 2, July 1976, p. 2-4 (hereafter "Reg. Guide 4.2").

a. Ecological System. In the Environmental Report, the Applicant discusses, to a limited extent, the anticipated short term impacts on mammals, raptors,

snakes, fish, and a few plant species that may be found within the vicinity of the proposed ISFSI site, Skull Valley Road, or the intermodal transfer station. The Applicant does not discuss and acknowledge the importance of the variety of species found in the Skull Valley ecological system, including aquatic organisms. The Applicant does not discuss the interdependence of various species on one another. The Applicant does not discuss the collective impact of the proposed action on the ecological system as a whole.

The Applicant does not discuss the impact of additional traffic, fugitive dust, radiation, and other pollutants on various species. Impact on wetland species, aquatic organisms, plants, fish, and birds are vastly different. The Applicant has failed to assess the individual and collective impacts on each species.

b. Endangered, Threatened Species, and other high interest species. The Applicant indicates that "except for transient, infrequent occurrences, there are no state or federally-listed threatened or endangered wildlife species known to occur within the site boundary. ER at 4.1-6, *emphasis added.* However, the Applicant identifies a federally endangered, peregrine falcon nest in the Timpie Springs Waterfowl Management Area. ER at 4.1-6, 7. The Applicant argues that the proposed action is unlikely to have any impact on peregrine falcons. Id. The Applicant ignores that the peregrine falcon nest on the Timpie Springs Waterfowl Management Area is adjacent to the proposed intermodal transfer station at Rowley Junction. The Applicant must

address all possible impacts on federally endangered or threatened species, including all potential behavior. Reg. Guide 4.2, at 2-4, n. 2.

The Applicant indicates that the Skull Valley pocket gopher is identified as a "high interest" species in the State of Utah. ER at 4.1-7. The Applicant indicates it will conduct a survey of gopher mounds prior to construction to avoid surface disturbance within 100 feet of any burrow. The Applicant must conduct the survey now to determine the presence of Skull Valley pocket gophers and the overall impact.

c. Culturally or Medicinal Species. The Applicant has not identified any plant species that may be culturally or medicinally (scientific) significant to various individuals. For example, the Confederated Tribes of Goshute Reservation gather plants in the vicinity of the Skull Valley Reservation. See, Request for Hearing and Petition to Intervene of the Confederated Tribes of the Goshute Reservation and David Pete, Docket No. 72-22, p.2, 3, filed August 28, 1997. The Applicant must determine whether significant plant species may be impacted by the proposed action.

d. Related Ecosystem Species. The Applicant has not identified aquatic plants which may be adversely impacted by the proposed action and upset the fragile ecological system of wetlands. Also, the Applicant indicates that "[n]o federal or state-listed threatened or endangered plant species are known to occur within the site or access road." ER at 4.1-3, *emphasis added.* However, the Applicant acknowledges two high interest" plants, Pohl's milkvetch and small spring parsley, may occur in the area.

ER at 4.1-4. The Applicant has not adequately assessed plant species and impact on those identified.

e. Domestic Species. The Applicant broadly describes and estimates the number of domestic livestock grazing on U.S. Bureau of Land Management property in the area. ER 2.2-2. However, the Applicant acknowledges, but does not identify the private domestic animal (livestock) or the domestic plant (farm produce) species in the area. Private property adjacent to the proposed site and Skull Valley Road is currently used for ranching and farming. *See*, Castle Rock Land and Livestock, L.C., Skull Valley Company, Ltd., and Ensign Ranches of Utah, L.C., Request for Hearing and Petition to Intervene, Docket No. 72-22, p. 2, filed March 11, 1997. Approximately 4,000 mother cows and calves winter on the private property north of the proposed facility and U.S. Bureau of Land Management Land. Id at 2 to 4. In addition, the private property produces a variety of crops, including alfalfa, oats, barley, and wheat. Id at 3. Adverse impacts may include impacts on livestock and plants from the radiological, chemical, heavy metal, noise, or visual pollution due to the proposed action.

3. Specific Habitats

a. Horseshoe Springs Wildlife Management Area. ("Horseshoe Springs") is located approximately 9.5 miles south of Timpie Junction (Rowley Junction) and approximately 1100 feet west of Skull Valley Road. ER 4.3-3. The U.S. Bureau of Land Management has designated Horseshoe Springs a wetland/riparian area and restricts disturbing activities, including new road construction or new right-of-ways,

within 1,200 feet. Id. The Applicant must identify the potential impacts to Horseshoe Springs and it species.

b. Timpie Springs Waterfowl Management Area. The proposed intermodal transfer station is located within the Timpie Springs Waterfowl Management Area. ER at 4.3-4. The Applicant must assess the potential impacts to Timpie Springs Waterfowl Management Area.

c. Great Salt Lake. The Applicant failed to assess the impact on the Great Salt Lake and its dependent species. The Great Salt Lake is just north of Timpie Springs Waterfowl Management Area, near the proposed intermodal transfer station. In addition, the Great Salt Lake is only 21.7 miles northeast of the proposed ISFSI site and the likely eastern transportation routes will closely follow the southern and eastern shorelines of the Great Salt Lake. The Great Salt Lake is a unique body of water that has no outlet and is, therefore, a sensitive ecosystem. Utah Administrative Code R317-2-6.6. Seventy-five percent of Utah's vital wetlands are supported by the greater Great Salt Lake Wetland Ecosystem. In addition, the Great Salt Lake is a western hemisphere shorebird reserve.

d. Salt Mountain Springs is approximately 300 feet west of Skull Valley Road. ER at 4.3-4. The Applicant indicates that the speckled dace, a state protected indigenous fish is known to inhabit one of the springs in the area. Id. The Applicant plans to implement sediment and erosion control measures to prevent any impacts, but

the Applicant does not discuss impacts from other sources, *e.g.*, radiation or other pollution. The Applicant does not discuss the various species that depend on the fragile wetland.

4. Failure to Conduct Adequate Surveys

The Environmental Report addresses ecological impacts to the environment by generically describing the "known" species within the vicinity of the proposed ISFSI site. ER at 2.3-1 to 21. Additionally, to a very limited extent, the Applicant identifies some of the species near Skull Valley Road and the intermodal transfer station at Rowley Junction. However, the Applicant does acknowledge that various species either exist within a potential impact area or that some additional data must be gathered. Rather than conduct a detailed analysis now, the Applicant has proposed to conduct some species surveys or to develop mitigation plans or prevention plans prior to initiating an action in that area. Unless the surveys are conducted and plans are prepared now, it is impossible to determine 1) if the ecological system is adversely effected by the proposed action as required by 10 CFR §§ 72.100(b) and 72.108, 2) if prevention or mitigation plans may be effectively implemented, or 3) whether the proposed transportation routes and ISFSI location are even feasible given various ecological impacts.

Dated this 23rd day of November, 1997

Respectfully submitted,

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	Docket No. 72-22-ISFSI
PRIVATE FUEL STORAGE, LLC	)	
	)	ASLBP No. 97-732-02-ISFSI
(Independent Spent Fuel Storage	)	
Installation)	)	November 23, 1997

CERTIFICATE OF SERVICE

I hereby certify that copies of STATE OF UTAH'S CONTENTIONS ON THE APPLICATION SUBMITTED BY PRIVATE FUEL STORAGE L.L.C. FOR 10 CFR PART 72 LICENSE TO CONSTRUCT AND OPERATE A SPENT FUEL STORAGE INSTALLATION, were served on the persons listed below by overnight hand delivery (unless otherwise noted) with conforming copies by United States First Class mail to those indicated, this 23rd day of November, 1997:

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Dated this 23rd day of November, 1997.

Denise Chancellor
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